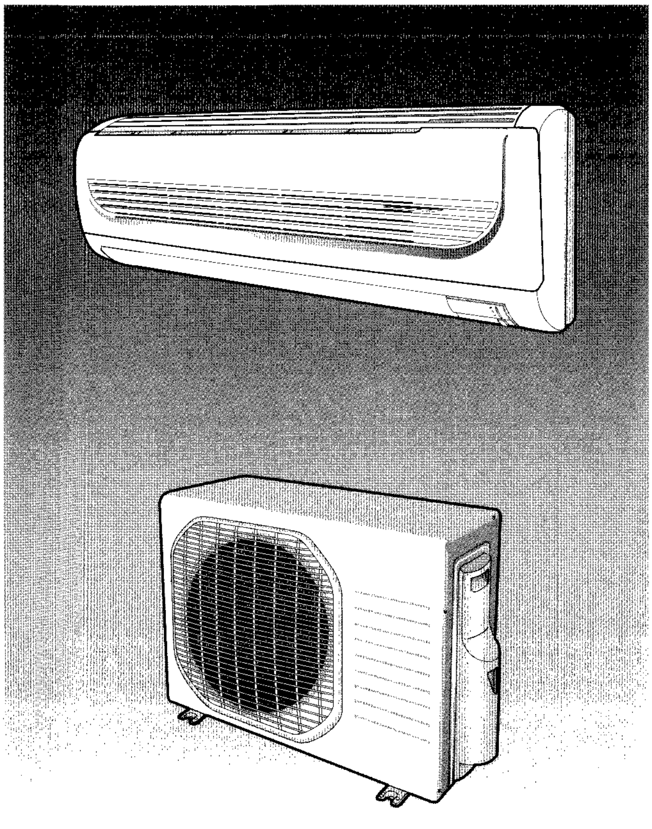
SAMSUNG

ROOM AIR CONDITIONER

INDOOR UNIT	OUTDOOR UNIT
SH09BWH	SH09BWHX
SH12BWH	SH12BWHX

SERVICE Manual

AIR CONDITIONER



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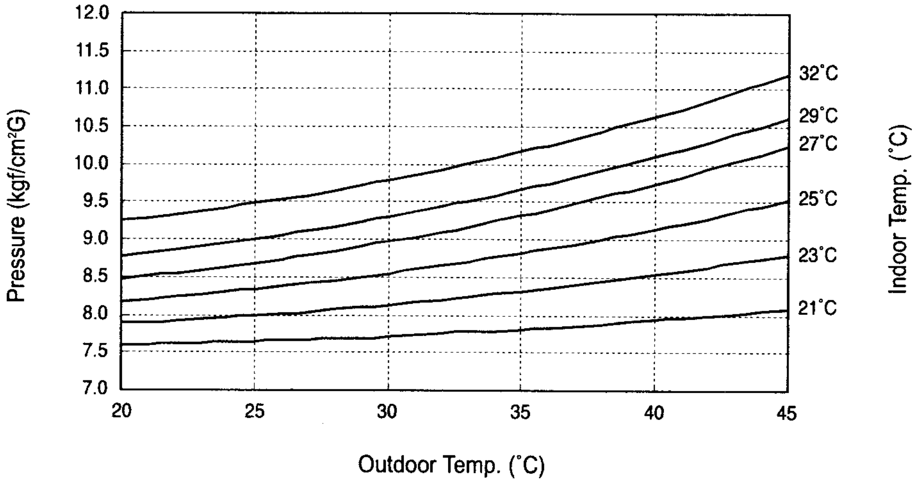
1. Product Specifications

1-1 Table

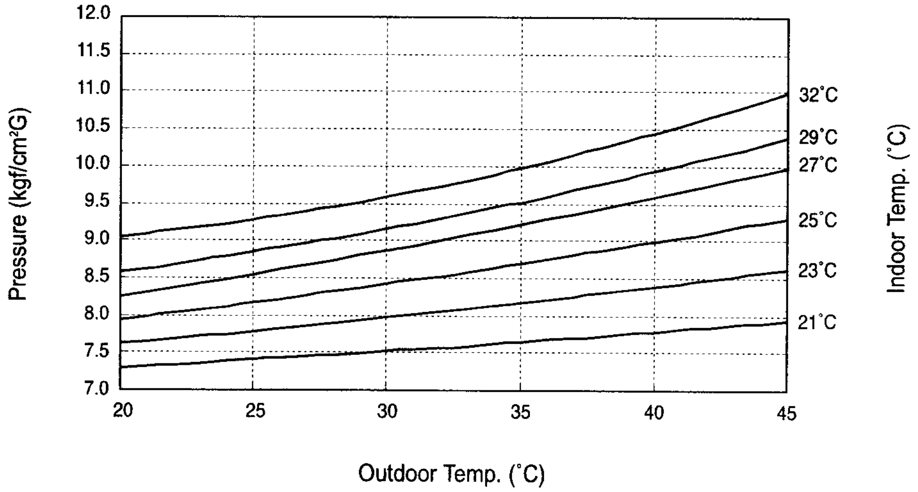
Item				Model	SH09BWH		SH12BWH	
					Indoor unit	Outdoor unit	Indoor unit	Outdoor unit
Type					Wall-mounted		Wall-mounted	
Perfor-mance	Cooling			kW	2.65(1.40~3.50)		3.50(1.40~4.00)	
	Heating			kW	3.60(1.40~4.40)		4.20(1.40~5.10)	
	Dehumidifying			ℓ/h	1.4		1.9	
	Air Volume	Cooling		m^3/min	8.5	25	8.7	25
		Heating			9.5	25	9.7	25
	Noise	Cooling		dB	40	52	41	52
		Heating			40	52	41	52
	Energy Efficiency Ratio	Cooling		W/W	3.79		3.26	
		Heating			3.83		3.61	
	Power			V-Hz	1, 220-240 / 50		1, 220-240 / 50	
Power	Power Consumption	Cooling		W	700(315~1,070)		1,074(315~1,350)	
		Heating			940(285~1,240)		1,165(290~1,575)	
	Operating Current	Cooling		A	3.3(1.7~5.0)		5.0(1.7~6.0)	
		Heating			4.4(1.6~5.4)		5.4(1.6~6.9)	
	Power Factor	Cooling		%	94.4		98.6	
		Heating			97.3		98.6	
	Starting Current			A	10↓		10↓	
	Power Cord	Length		m	-		-	
		Number of Core Wire			-		-	
		Capacity		A	250V, 15A		250V, 15A	
Size	Outer Dimension	Width x Height x Depth		mm	825 x 285 x 189	720 x 548 x 265	825 x 285 x 189	720 x 548 x 265
				inch	32.5 x 11.2 x 7.44	28.4 x 21.6 x 10.4	32.5 x 11.2 x 7.44	28.4 x 21.6 x 10.4
	Weight(Net)			kg	8.4	33.2	8.4	33.2
	Refrigerant Pipe	Liquid		mm x L(m)	ø6.35 x 7.5		ø6.35 x 7.5	
		GAS		mm x L(m)	ø9.52 x 7.5		ø9.52 x 7.5	
	Drain Hose			D x L(mm)	ø18 x 550		ø18 x 550	
	Compressor	Type			Rotary(SAMSUNG)		Rotary(SAMSUNG)	
		Motor	Type		3 PHASE DC MOTOR		3 PHASE DC MOTOR	
			Rated Output		860		860	
	Oil Type				PVE(FV50S)		PVE(FV50S)	
	Blower	Type			Cross-flow	Propeller	Cross-flow	Propeller
		Motor	Type		steel	steel	steel	resin
			Rated Output	W	16	20	16	25
Heat Exchanger					2ROW 12STEP	2ROW 24STEP	2ROW 12STEP	2ROW 24STEP
Refrigerant Control Unit					EEV + CAPILLARY TUBE		EEV + CAPILLARY TUBE	
Freezer Oil Capacity				cc	320		320	
Refrigerant to Change(R410A)				g	1,000		1,000	
Protection Device(OLP)					204CTB		204CTB	
Cooling Test Condition					INDOOR UNIT : DB27˚C WB19˚C		OUTDOOR UNIT : DB35˚C WB24˚C	
Maximum Operation Condition					INDOOR UNIT : DB32˚C WB23˚C		OUTDOOR UNIT : DB43˚C WB26˚C	

1-2 Pressure Graph

■ SH09BWH

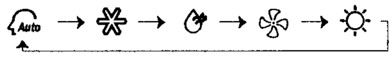
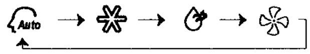


■ SH12BWH



2. Operating Instructions

2-1 The Feature of Key in remote control

No	BUTTON	FUNCTION
1	POWER ⏻	On/Off button. Press the ⏻ button to stop or run the air conditioner.
2	△ (UP)	Temperature adjustment button(UP). The temperature is increased by the pressing the temperature button.
	▽ (DOWN)	Temperature adjustment button(DOWN). The temperature is decreased by the pressing the temperature button.
3	MODE ○	Mode selection button. Each time you press this button, mode is changed in the following order Auto : Auto Mode ❄ : Cool Mode 💧 : Dry Mode ✤ : Fan Mode ☼ : Heat Mode ▶ **In case of Heat pump model**  ▶ **In case of Cooling only model** 
4	FAN SPEED ○	Fan speed adjustment button. Each time you press this button, FAN SPEED is changed in the following order. ✤▪▪▮ Automatic(rotated : ✤▪ ➡ ✤▪▪ ➡ ✤▪▪▮) ✤▪ Low ✤▪▪ Medium ✤▪▪▮ High
5	FLAP ○	Flap button. It adjusts the airflow to upward and downward.
6	TURBO ○	Turbo button. The air conditioner cools or heats the room as quickly as possible. After 30minutes, the air conditioner is reset automatically to the previous mode.
7	ENERGY SAVING ○	Energy saving button. If you wish to save energy when using your air conditioner, select the Energy saving mode with the ENERGY SAVING ○ button.
8	SLEEP ○	Sleep button. The sleep timer can be used when you are cooling or heating your room to switch the air conditioner off automatically after a period of 6 hours.

No	BUTTON	FUNCTION
9	ON ◷ ○	On Timer button. The On Timer enables you to **switch on** the air conditioner automatically after a given period of time that is from 1 hour to 24 hours. To set the operating time, press the ON ◷ ○ button one or more times until the required time display.
10	OFF ◷ ○	Off Timer button. The Off Timer enables you to **switch off** the air conditioner automatically after a given period of time that is from 1 hour to 24 hours. To set the operating time, press the OFF ◷ ○ button one or more times until the required time display.
11	SET/CANCEL ○	Timer Set/Cancel button. After setting On Timer or Off Timer, press the SET/CANCEL ○ button to set it completely. And press the SET/CANCEL ○ button again to cancel On Timer or Off Timer set.
12	BATTERY ○	Battery life indicator. If you want to check the battery life, press the BATTERY ○ button. The longer will remain the battery life. If one battery life indicator remains, replace new batteries.

2-1-1 Name & Function of key in remote control

1. AUTO MODE : In this mode, operation mode(COOL, HEAT) is selected automatically by the difference between the setting and room temperature.

   ▶ **In case of Heat pump model.**
   Cooling or heating operation is selected based on difference of Ts and Tr. Cooling and heating operation is automatically interchanged during an operation.

   ▶ **In case of Cooling only model.**

Operation Type	Room Temp.	
Cool Operation	Tr ≥ Ts+1.0°C	Compressor ON
	Tr ≤ Ts	Compressor OFF

   Ts : Setting temperature.

2. COOL MODE : The unit operates according to the difference between the setting and room temperature. (16°C~30°C)

3. HEAT MODE(In case of Heat pump model) :
   The unit operates according to the difference between the setting and room temperature.(16°C~30°C)
   *Prevention against cold wind : In order to prevent the cool air from flowing out at the heat mode, the indoor fan does not operate or operates very slowly in the following cases At this time, the indoor heat exchanger will be preheating.
   - For 3~5 minutes after the initial operation
   - For deicing operation
   - The operation of an indoor fan in accordance with the temperature of an indoor heat exchanger

The temperature of indoor heat exchanger	Indoor fan speed
below 28°C	off
28°C~below 34°C	LL Speed
34°C~below 40°C	L Speed
above 40°C	Setting Speed

   *High temperature release function : It is a function to detect an outdoor overload by the sensor of an indoor heat exchanger and to turn the outdoor fan or the compressor ON/OFF for safety.
   *Deice : Deicing operation is controlled by indoor unit's heat exchanger temperature and accumulating time of compressor's operation.
   Deice ends by sensing of the processing time by deice condition.

4. DRY MODE : Has 4 states, each determined by room temperature.
   The unit operates in DRY mode.
   *Compressor ON/OFF time is controlled compulsorily (can not set up the fan speed, always breeze).
   *Protective function : Low temperature release. (Prevention against freeze)

5. TURBO MODE : This mode is available in AUTO, COOL, HEAT, DRY, FAN MODE.
   When this button is pressed at first, the air conditioner is operated "powerful" state for 30 minutes regardless of the setting temperature, room temperature.
   When this button is pressed again, or when the operating time is 30 minutes, turbo operation mode is canceled and returned to the previous mode.
   *But, if you press the TURBO button in DRY or FAN mode that is changed with AUTO mode automatically.

6. SLEEP MODE : Sleep mode is available only in COOL or HEAT mode.
   The operation will stop after 6 hours.
   *In COOL mode : The setting temperature is automatically raised by 1°C each 1hour When the temperature has been raised by total of 2°C, that temperature is maintained.
   *In HEAT mode : The setting temperature is automatically dropped by 1°C each 1hour.
   When the temperature has been dropped by total of 2°C, that temperature is maintained.

7. FAN SPEED : Manual (3 step), Auto (4 step)
   Fan speed automatically varies depending on both the difference between setting and the room temperature.

8. COMPULSORY OPERATION :
   For operating the air conditioner without the remote control.
   *The operating is the same function that AUTO MODE in the remote control.

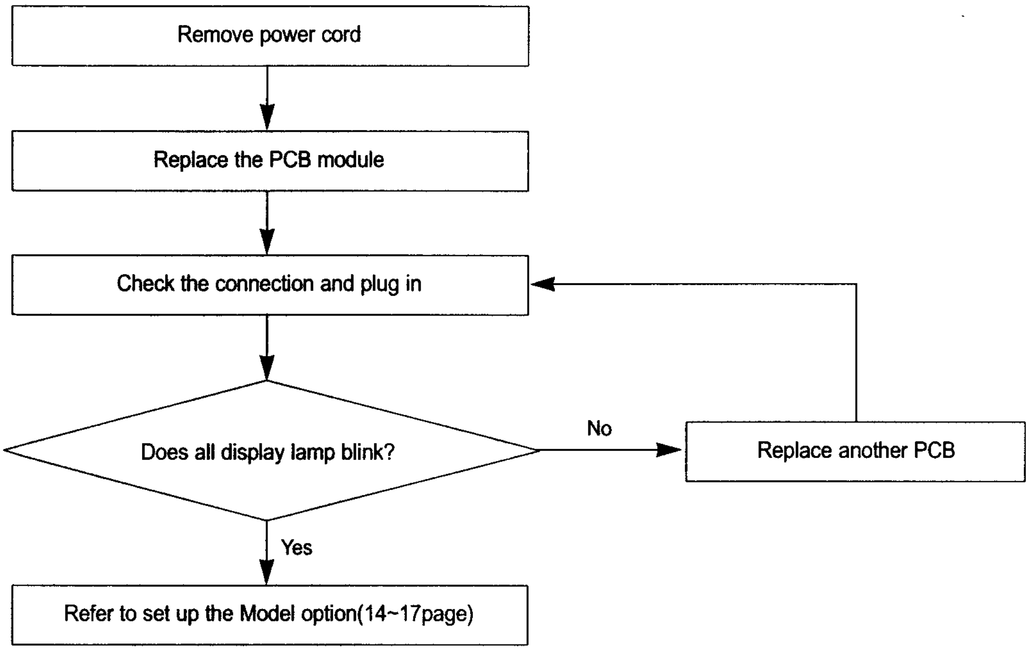
9. FLAP : BLADE-H is rotated vertically by the stepping motor.
   *Flap Set : Press the ○ button under the remote control is displayed on LCD the and the blades move up and down. If the ○ button press one more time, blades rotation is stop.

10. SETTING THE ON/OFF TIMER. :
   *ON TIMER : The On Timer enables you to switch on the air conditioner automatically after a given period of time. You can set the period of time from 1 hour to 24 hours.
   *OFF TIMER : The Off Timer enables you to switch off the air conditioner automatically after a given period of time. You can set the period of time from 1 hour to 24 hours.

11. BUZZER SOUND : Whenever the On/Off button is pressed or whenever change occurs to the condition which is set up or select, the compulsory operation mode, buzzer is sounded "beep".

2-2 Replace PCB Model option

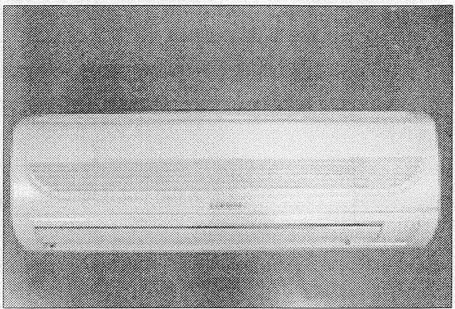
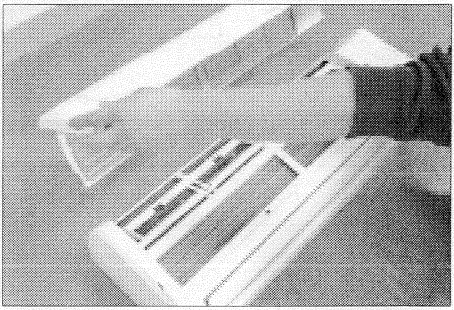
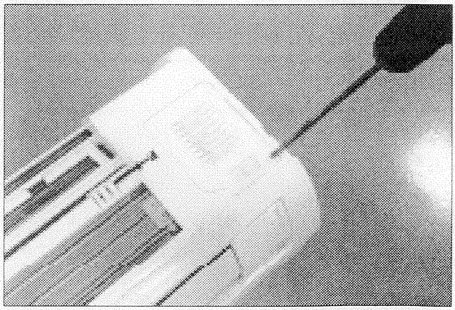
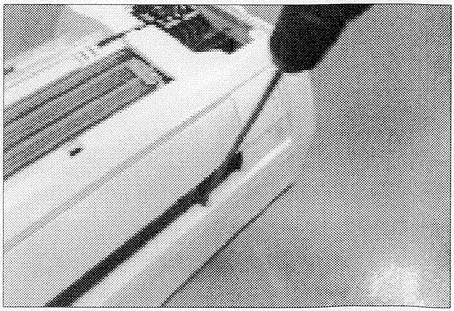
2-2-1 Replace PCB model option

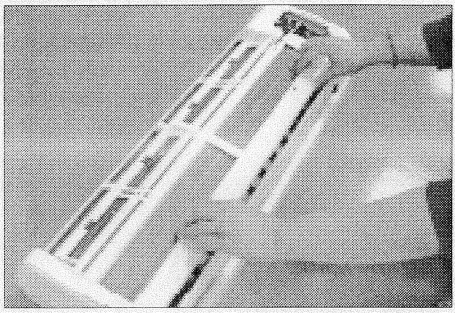
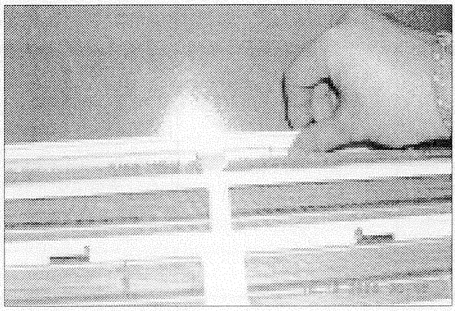
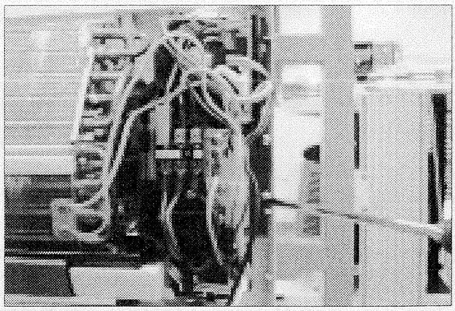
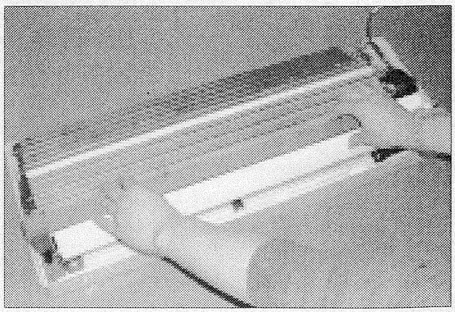

Remove power cord
Replace the PCB module
Check the connection and plug in
Does all display lamp blink?
No
Replace another PCB
Yes
Refer to set up the Model option(14~17page)

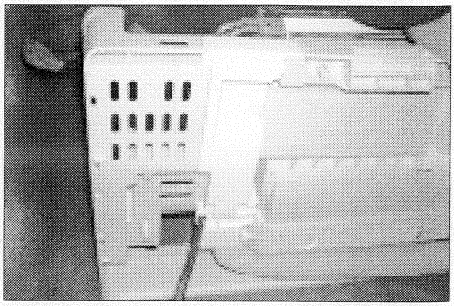
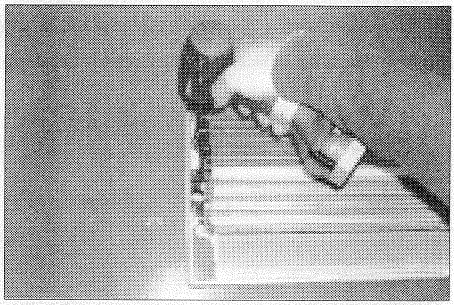
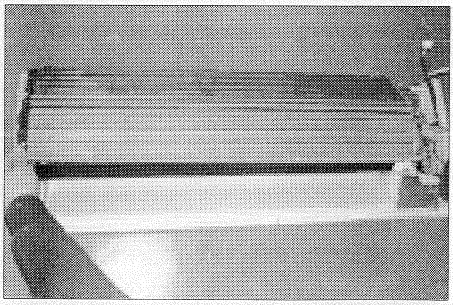
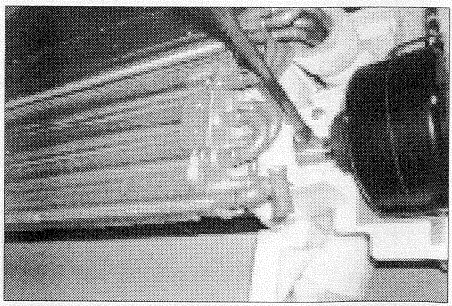
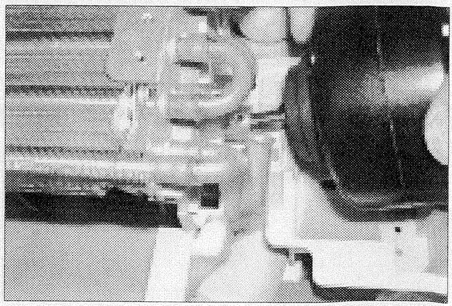
3. Disassembly and Reassembly

Stop operation of the air conditioner and remove the power cord before repairing the unit.

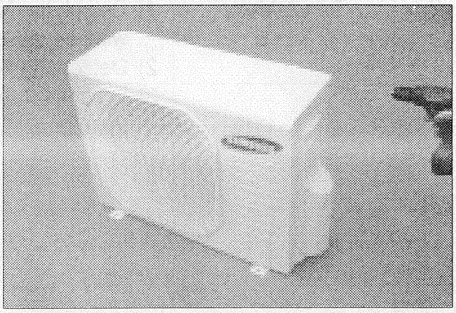
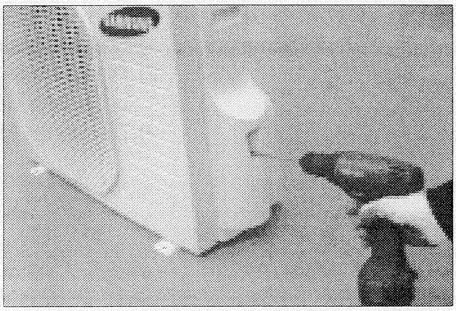
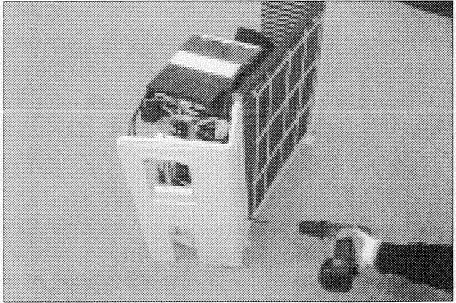
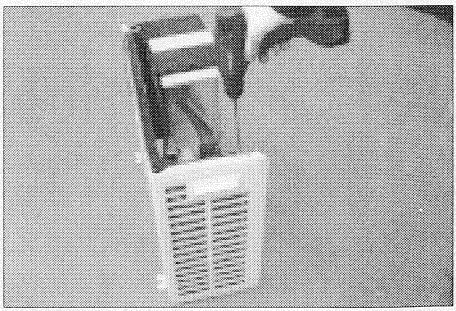
3-1 Indoor Unit

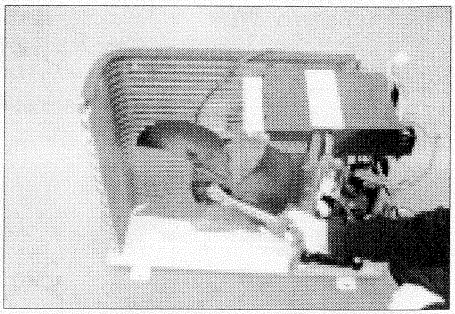
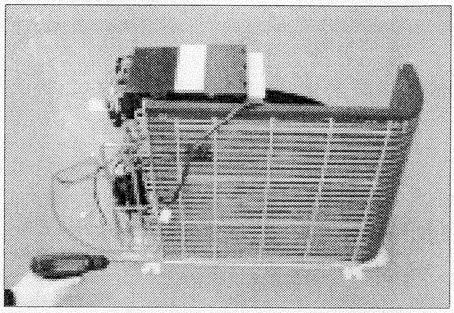
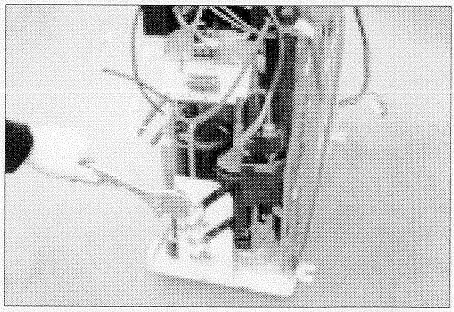
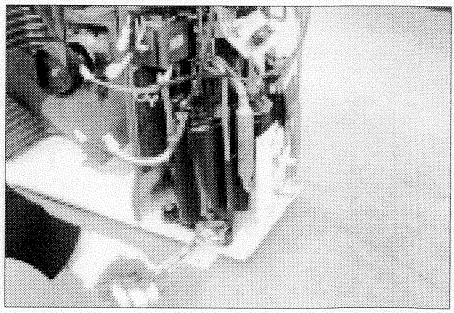
No	Parts	Procedure	Remark
1	Front Grille	1) Stop the air conditioner operation and block the main power.	
		2) Open the Front Grille by pulling right and left sides of the hook.	
		3) Loosen 1 of the right screw and detach the Terminal Cover. 4) Detach the thermistor from the Front Grille.	
		5) Loosen 2 fixing screws of Front Grille.	

No	Parts	Procedure	Remark
		6) Unlock 2 hooks to fix Panel Front and Tray Drain.	
		7) Unlock 3 hooks to fix Panel Front and Back-Body.	
2	Control-In (Main PCB)	1) Take all the connector of PCB upper side out. (Inclusion Power Cord) 2) Detach the outdoor unit connection wire from the Terminal Block. 3) Loosen 4 fixing screws of Ass'y Control-In.	
3	Tray Drain	1) Pull Tray Drain out from the Back Body.	

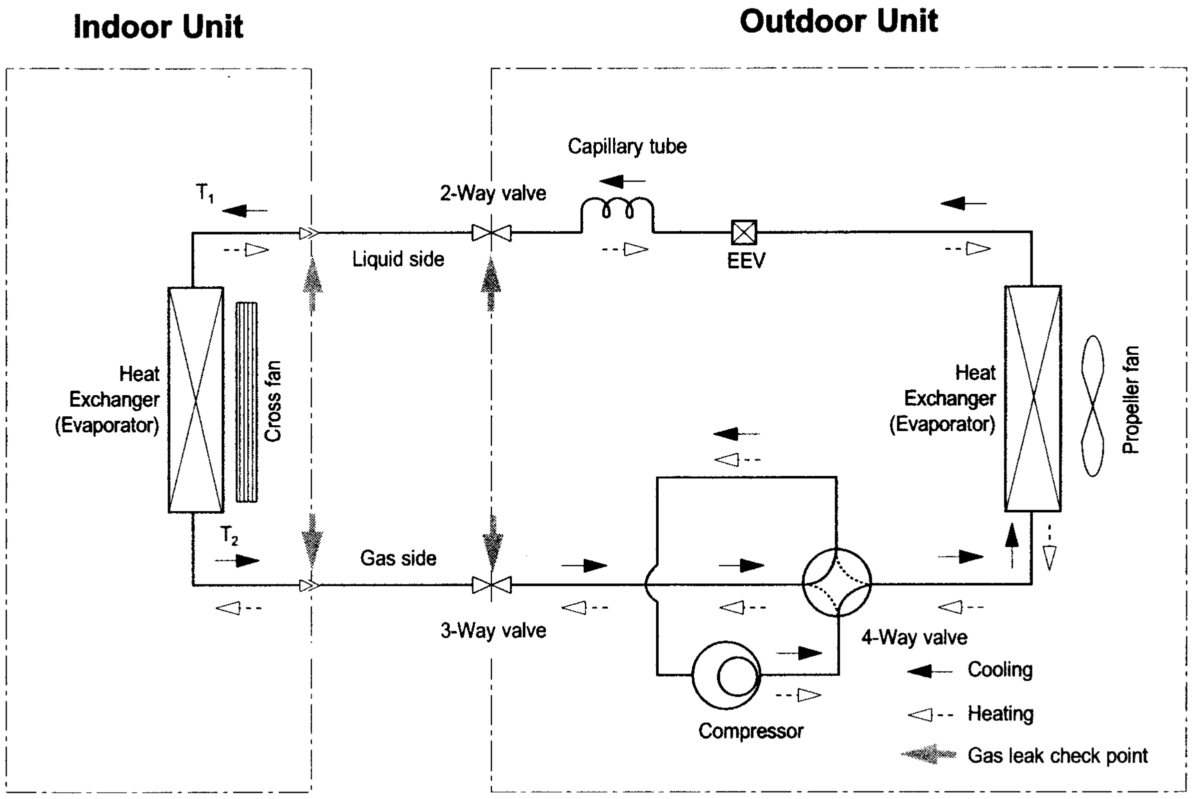
No	Parts	Procedure	Remark
4	Heat Exchanger	1) Loosen 2 fixing earth screws of right side. 2) Detach the Connection Pipe. 3) Detach the Holder Pipe at the rear side. 4) Loosen the 3 fixing screws of right and left side. 5) Lifting the Heat Exchanger up a little to push the up side for separation from the indoor unit.	  
5	Fan Motor & Cross Fan	1) Loosen the fixing screw and detach the Motor Holder. 2) Detach the Fan Motor from the Fan. 3) Detach the Fan From the left Holder Bearing.	 

3-2 Outdoor Unit

No	Parts	Procedure	Remark
1	Common Work	1) Loosen each 3 fixing screws on both right and left Cabinet-Side edge and a fixing screw on the Cabinet-Front lower to detach the Cabinet-Front.	
		2) Loosen 1 fixing screws of the Cover-Valve.	
		3) Loosen 6 fixing screws of the Cabinet-Side RH.	
		4) Loosen 2 fixing screws of the Cabinet-Side LF.	

No	Parts	Procedure	Remark
2	Fan & Motor	1) Detach the Nut Flange.(Turn counterclockwise because the screw is right-handed) 2) Detach the Fan. 3) Loosen 4 fixing screws to detach the Motor.	
3	Heat Exchanger	1) Loosen 2 fixing screws on both sides. 2) Disassemble the pipe in both inlet and outlet with welding torch. 3) Detach the Heat Exchanger.	 
4	Compressor	1) Loosen the Terminal Cover nut to open the Terminal Cover. 2) Disassemble the cloth sound felt. 3) Disassemble the pipe in both inlet and outlet of the Compressor with welding torch. 4) Disassemble the pipe in both inlet and outlet of the Condenser with welding torch. 5) Loosen the 3 bolts at the bottom. 6) Detach the Compressor.	

4. Refrigerating Cycle Diagram

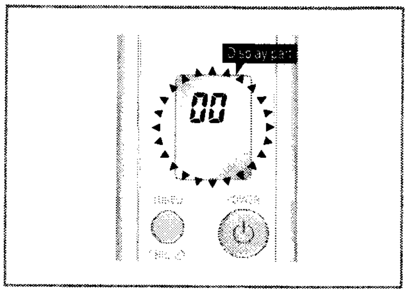

Indoor Unit
Outdoor Unit
T1
T2
Heat Exchanger (Evaporator)
Cross fan
Liquid side
Gas side
2-Way valve
3-Way valve
Capillary tube
EEV
Heat Exchanger (Evaporator)
Propeller fan
4-Way valve
Compressor
Cooling
Heating
Gas leak check point

5. Set Up the Model Option

5-1 Setting Option Setup Method

ex) Option No. : 05 0 1 00 13 5 1

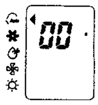
Step 1 : Enter the Option Setup mode.


Display part
00

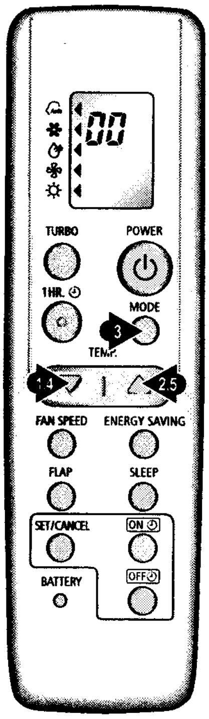
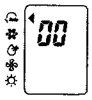
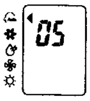
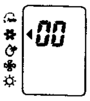
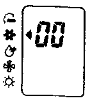
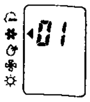
1st Take out the batteries of remote control.

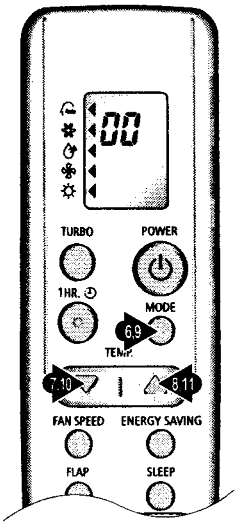
2nd Press the temperature (▽ | △) button simultaneously and insert the battery again.

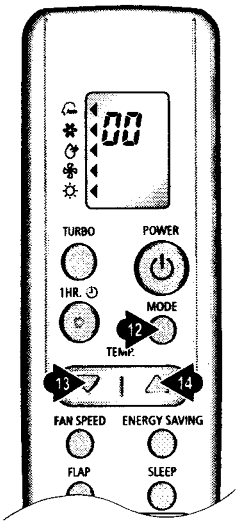
3rd Make sure the remote control display shown as

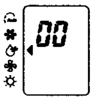
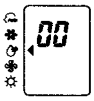
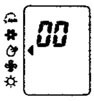
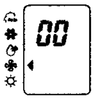
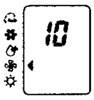
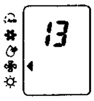
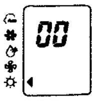
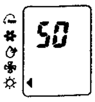
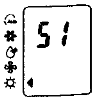


Step 2 : Enter the Option Setup mode and select your option according to the following procedure.

	Feature	Display
 00 TURBO POWER 1HR. MODE 3 TEMP. 1.4 2.5 FAN SPEED ENERGY SAVING FLAP SLEEP SET/CANCEL ON BATTERY OFF	**1** Setting Option SEG1. Push the ▽ button to set the display panel to 0. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
	2 Setting Option SEG2. Push the △ button to set the display panel to 5 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
	3 Change it into the set display of Option SEG3 and SEG4 with the MODE ○ button.	
	4 Setting Option SEG3. Push the ▽ button to set the display panel to 0. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
	5 Setting Option SEG4. Push the △ button to set the display panel to 1 . Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	

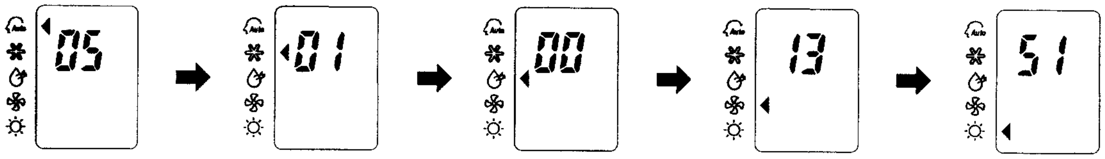

00
TURBO
POWER
1HR.
MODE
6.9
TEMP.
7.10
8.11
FAN SPEED
ENERGY SAVING
FLAP
SLEEP


00
TURBO
POWER
1HR.
MODE
12
TEMP.
13
14
FAN SPEED
ENERGY SAVING
FLAP
SLEEP

	Feature	Display
6	Change it into the set display of Option SEG5 and SEG6 with the MODE ○ button.	
7	Setting Option SEG5. Push the ▽ button to set the display panel to 0. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
8	Setting Option SEG6. Push the △ button to set the display panel to 0. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
9	Change it into the set display of Option SEG7 and SEG8 with the MODE ○ button.	
10	Setting Option SEG7. Push the ▽ button to set the display panel to 1. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
11	Setting Option SEG8. Push the △ button to set the display panel to 3. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
12	Change it into the set display of Option SEG9 and SEG10 with the MODE ○ button.	
13	Setting Option SEG9. Push the ▽ button to set the display panel to 5. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	
14	Setting Option SEG10. Push the △ button to set the display panel to 1. Every time you push the button, the display panel reads 0 → 1 → 2 → 3 → ··· 9 → A → b → c → d → E → F repeatedly.	

Step 3 : Upon completion of the selection, check you made right selections.

Whenever you press the MODE button, the set Option will be displayed.



Step 4 : Pressing the ON/OFF button (⏻)

When pressing the operation ON/OFF key with the direction of remote control for unit, the sound "Ding" is heard and the OPERATION LED lamp is flickering at the same time, then the input of option is completed. (If the "ding" sound isn't heard, try again pressing the ON/OFF button.)

Step 5 : Unit operation test-run

First, Remove the battery from the remote control.

Second, Re-insert the battery into the remote control.

Third, Press ON/OFF (⏻) key with the direction of remote control for set.

- **Error Mode**

1st If all lamps of indoor unit are flickering, Plug out, plug in power plug again and press ON/OFF key to retry.

2nd If the unit is not working properly or all lamps are continuously flickering after setting the option code, see if the correct option code is set up for its model.

5-2 Table of the option Code

Model	Option Code									
	SEG1	SEG2	SEG3	SEG4	SEG5	SEG6	SEG7	SEG8	SEG9	SEG10
SH09BWH	0	5	0	0	0	0	1	3	4	0
SH12BWH	0	5	0	1	0	0	1	3	5	1

6. Troubleshooting

Since the inverter air conditioner is equipped with Electrical control circuits at both Indoor & outdoor unit, the trouble shooting shall be performed according to the error mode.
Inside the controller of the outdoor unit (inverter), the large capacity of electrolytic condenser so that it takes the time to discharge after the power off since the electrical charge remains(the charging voltage DC 340V).
Take care of the electrical shock by contact on the charging part before the discharge after the power off. (It takes approximately 2 minutes to discharge).

6-1 Basic items for trouble shooting

1. Is the power source proper?
   The power source shall be in the range of the rated voltage ±10%. If it is out of this range, it may cause the abnormal operation.
2. Is the connection made between the indoor and outdoor unit?
   The connection between indoor and outdoor unit shall be performed with 4 wire. (connection cable of indoor and outdoor unit + ground wire).
3. The phenomena as follows are not out of order.

No	Phenomena	Cause and reason
1	The operation is not done.	• Is the power off or the power unplugged? • Does it stop because it is the completion time? • Unplug and plug again the power source for 2 minutes.
2	The wind comes out but the heating/cooling is not performed.	• Is the filter clogged with dust or dirty? • Is there any direct light on the outdoor unit or any obstacle against it? • Is the selected temperature too high? Lower the selected temperature lower than the current one (during cooling). • Is the selected temperature too low? Raise the desired temperature than the current one? (during heating) • Is the "Fan only Mode" operation?
3	The remote control does not operate.	• Is the battery run out? • Is the battery inserted in the wrong way(+, -)? • Is the detection part of the indoor unit blocked? • Does it interfered with the radio of neon sign?
4	The wind volume is not adjusted.	• Is the operation selected among one of Auto / Dry / Turbo / Sleeping? • The temperature setting is not required since the wind volume set automatically. • Check again at the state of Cooling / Fan only / Heating.
5	The temperature is not set.	• Is the operation selected among the Dry / Turbo / Sleeping / Fan only Mode. Since the temperature is automatically set, the temperature setting is not required. • Check again at the cooling / heating state. • The standard temperature ±2°C during the automatic operation.
6	The operation lamp continues to be flickering.	• Push the Operation / Stop button. • Unplug and plug the power source.
7	The immediate operation starts without control of remote control when plugged	• It is the case that the auto restart function works. ∗Auto restart function is the convenient function where the operation state is memorized in the Memory IC during the blackout and the operation restarts when the power comes back.

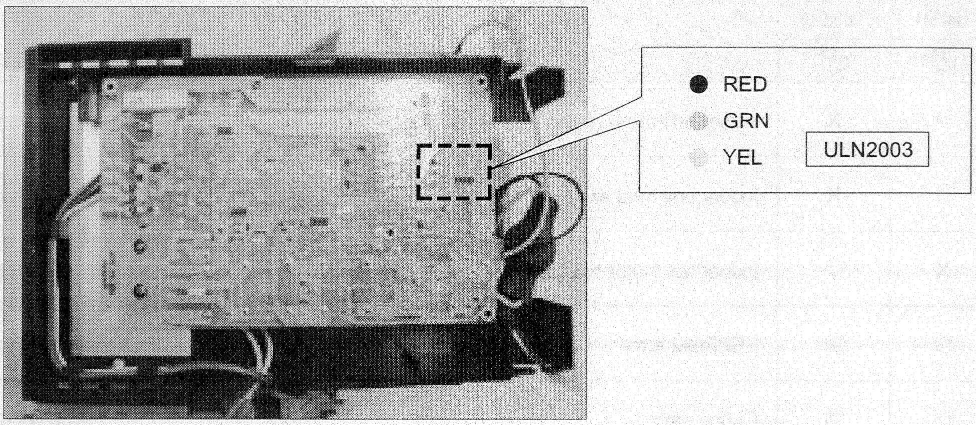
6-2 The first determination method of troubled part

6-2-1 Error mode display of indoor unit

LAMP			Description	Check point	
OPERATION	**TIMER**	**TURBO**			
≋	⏲	⟳		**INDOOR**	**OUTDOOR**
X	◎	X	Indoor unit room temperature sensor error (open / short)	Temp.-Sensor	
◎	◎	X	Indoor unit heat exchanger temperature sensor error (open / short)	Temp.-Sensor	
X	X	◎	Indoor fan motor malfunction	Fan and cable	
◎	◎	◎	EEPROM error	PCB	
◎	◎	◎	Option error	Option code	
X	◎	◎	Abnormal communication error (Indoor - Outdoor unit)	PCB, Cable between Indoor and outdoor unit	
◎	X	◎	Outdoor unit temperature sensor error		
			- Outdoor temp.-sensor		Temp.-Sensor
			- Deice temp.-sensor		Temp.-Sensor
			- OLP temp.-sensor		Temp.-Sensor
			- Discharge temp.-sensor		Temp.-Sensor
			- Heatsink temp.-sensor		PCB

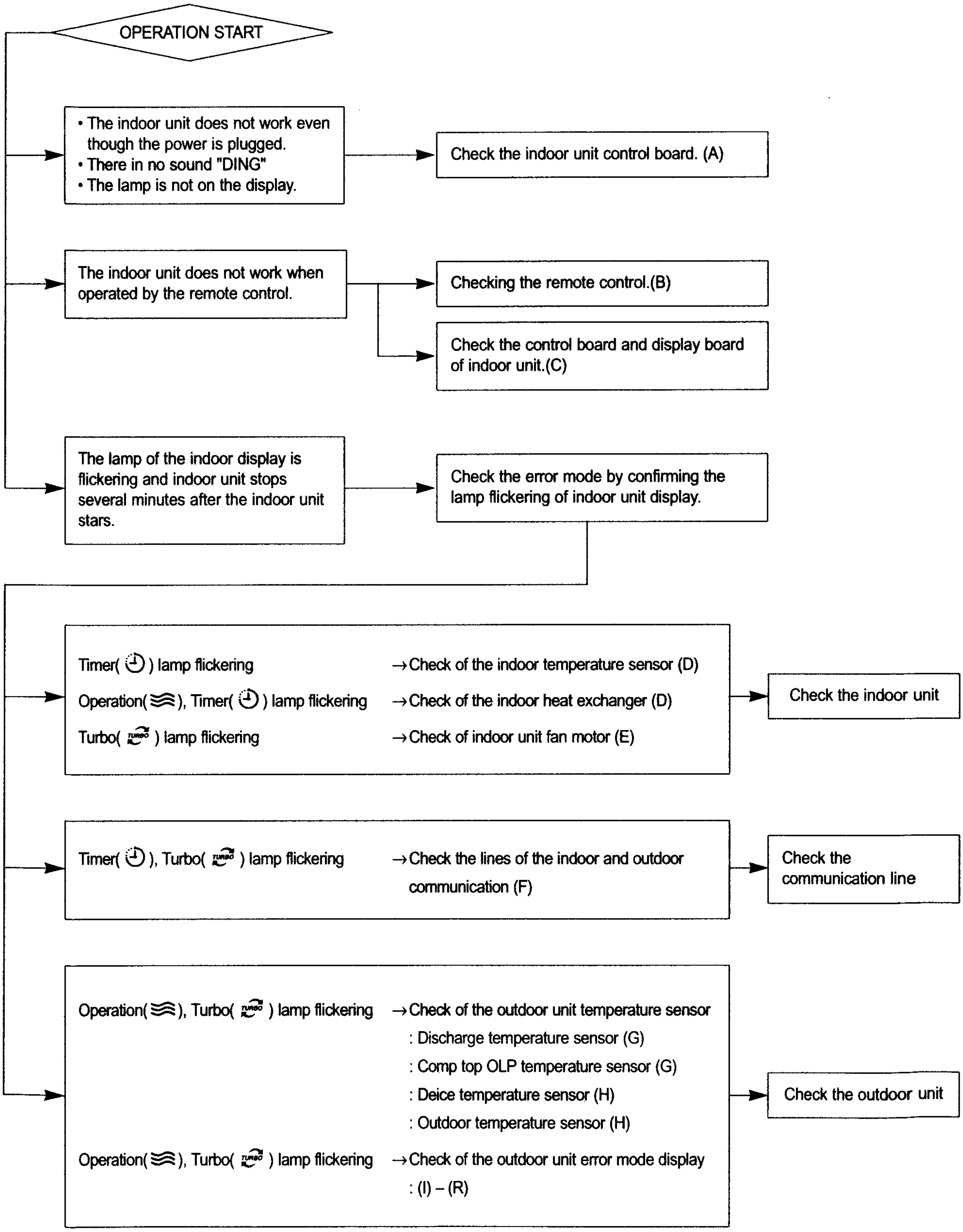
X : Lamp off ◎ : Lamp flickering

6-2-2 Error mode display of outdoor unit board



LAMP of Display Monitor			**Description** ● : Lamp on ◎ : Lamp flickering X : Lamp off
YELLOW	GREEN	RED	
X	X	X	Power Off / VDD NG
X	X	◎	Comp. Peak Current (O.C.)
X	X	●	Communication NG
X	◎	X	Comp. Starting error
X	◎	◎	Heatsink sensor error
X	◎	●	Normal Operation
X	●	◎	DC-link overvoltage error
X	●	●	4-Way valve error
◎	X	X	Heatsink Temp. trip
◎	X	◎	Outdoor Sensor error(Open/Short)
◎	X	●	Discharge sensor temp. trip
◎	◎	X	Discharge sensor error(Open/Short)
◎	◎	◎	OLP sensor error(Open/Short)
◎	◎	●	CT sensor error
◎	●	X	Unit Over Current protection
◎	●	◎	Deice sensor error(Open/Short)
◎	●	●	OLP sensor temp. trip
●	X	◎	OPTION error (EEPROM)
●	X	●	Compressor rotation error
●	◎	X	DC fan error (SH12BWHX only)
●	◎	◎	DC-Link voltage sensor error
●	◎	●	PFC OC error
●	●	X	NO GAS error
●	●	◎	AC Line zero-crossing error

6-3 Sequence of trouble shooting for inverter aircon



OPERATION START

- The indoor unit does not work even though the power is plugged.
- There in no sound "DING"
- The lamp is not on the display.

Check the indoor unit control board. (A)

The indoor unit does not work when operated by the remote control.

Checking the remote control.(B)

Check the control board and display board of indoor unit.(C)

The lamp of the indoor display is flickering and indoor unit stops several minutes after the indoor unit stars.

Check the error mode by confirming the lamp flickering of indoor unit display.

Timer(⏲) lamp flickering →Check of the indoor temperature sensor (D)

Operation(≋), Timer(⏲) lamp flickering →Check of the indoor heat exchanger (D)

Turbo(TURBO) lamp flickering →Check of indoor unit fan motor (E)

Check the indoor unit

Timer(⏲), Turbo(TURBO) lamp flickering →Check the lines of the indoor and outdoor communication (F)

Check the communication line

Operation(≋), Turbo(TURBO) lamp flickering →Check of the outdoor unit temperature sensor

: Discharge temperature sensor (G)

: Comp top OLP temperature sensor (G)

: Deice temperature sensor (H)

: Outdoor temperature sensor (H)

Operation(≋), Turbo(TURBO) lamp flickering →Check of the outdoor unit error mode display

: (I) – (R)

Check the outdoor unit

6-3-1 (A) Check of indoor unit control board

▶ Unplug the power cord and plug it after 5 seconds.

▶ Press the on/off switch located indoor unit inside to operate the air conditioner.

- If the air conditioner operates, check the remote control and indoor unit display board.
- If the air conditioner does not operates, check according to the sequence of the followings:

▶ Check sequence of indoor unit control board

Step 1 : Check whether two wires of power cord (Sky-blue, brown) are connected correctly to the terminal block and Relay on the control board.

- Sky -blue : connected to "N(1)" of Terminal block
- Brown : connected to RY71 Tab terminal (control board outer side)

Step 2 : Check whether the wire connected to the terminal block is connected to th control board.

(Control board)		(Terminal block)
CN71	SKY-BLU	N(1)
RY71	BRN	1
CN71	BLK	2

Step 3 : Check whether the fuse (F701) on the control board is normal. (3.15[A]/250[V]:F701)

- If the fuse is broken, replace it with new one.

Step 4 : Check the output voltage of SMPS on the control board.

- Input power AC178 ~ AC 264V— • CN22 1-3pin : DC12V
  CN22 2-3pin : DC5V

✳CN22 : As socket not mounted measure at the solder points

Step 5 : Check whether the control board gets wet with dew

- Dry the control board.

Step 6 : Check whether tiny metal objects make a short circuit on the PCB, especially between pins of the surface mount IC.

- remove the objects. Do not use splay solvent or some components may get damage by solvent.

6-3-2 (B)(C) Display board and remote control check of indoor unit

▶ Check whether the connection wire of Display board is correctly connected to CN91 connector.

▶ Check the voltage of remote control battery. - the voltage of one battery shall be higher than about 1.4V, and then the remote control operates normally.

▶ Check whether the neon sign is on and the 3 wave long fluorescent lamp is on around the indoor unit. - After putting all lamps of the indoor out and then operate it by remote control. If it operates with the remote control, it is the abnormality due to the interference from the light of lamps. (Aircon unit is normal).

6-3-3 (D) Check the indoor temperature sensor and indoor heat exchanger temperature sensor.

Take out the thermistor connected to the connector (CN43) of control board of indoor unit and measure the resistance between two wires and if it is same as follows: it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

6-3-4 (E) Check of indoor unit fan motor

- ▶ Check whether the wires are connected surely between control board(CN72) and running capacitor(Tab).
- ▶ Check whether the wire of fan motor is connected to the control board (CN73,CN44) of indoor unit.
- ▶ Check whether the error mode displays after the strong rotation for approximately 15 seconds since air conditioner turned on.
  - • In case the error code displays after the fan motor is rotating for 15 seconds. → Defect of HALL IC of fan motor and/or control board.
  - • In case that error code displays without fan motor rotating after 15 seconds. → Operate with making short circuit of AC side pins of SSR(SS71) of indoor unit control board. And then if the fan motor does not operate, it is the fan motor defect.
    If it rotates, it is the defect of control board(SS71,IC05,IC04).

6-3-5 (F) Check of communication line between the indoor unit and outdoor unit

■ Communication error mode

1. Check of connection

- ▶ Check whether the cable wire connecting the indoor unit with outdoor unit is correctly connected to the N(1), 1, 2 terminal.
  (If the wire is connected reversely, the communication error occurs)
- ▶ If the cable connecting the indoor unit and outdoor unit is longer than 20m, error mode may occur (shorten the cable length).

■ Check of indoor unit

▶ Check whether the connection wire of the terminal block and control board of indoor unit is correct.

(Control board)		(Terminal block)
CN71	SKY-BLU	N(1)
RY71	BRN	1
CN71	BLK	2

■ Check of outdoor unit

▶ Check whether the connection wire of the terminal block and control board of outdoor unit is correct.

(Control board)		(Terminal block)
TB-N	SKY-BLU	N(1)
TB-L	BRN	1
CN04	BLK	2

2. Check of power supply to the outdoor unit

After operation of aircon, select the turbo mode and approximately 3minutes later, check whether the red color lamp of control board (to be seen if the top cover of outdoor unit) is on.

→ If the red lamp (LED 1) is not on, check the power part of control board of outdoor unit.

• Check the connection of reactor.

→ If the red lamp (LED 1) is on and green lamp is flickering, it is normal.

6-3-6 (G) Check of discharge temperature sensor and comp top OLP temperature sensor.

▶ Connector of outdoor unit control board
(PIN#3,4 of CN51 - discharge temperature sensor), (PIN#1,2 of CN52-OLP Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace.

Ambient temperature (°C)	0°C	10°C	20°C	30°C	40°C	50°C	
Resistance of thermistor [KΩ]	553	362	242	166	165	82	

6-3-7 (H) Check the defrost temperature sensor and outdoor temperature sensor.

▶ Connector of outdoor unit control board
(PIN#1,2 of CN51 - outdoor temperature sensor),(PIN#3,4 of CN52-deice Temperature sensor)
Measure the resistance between two wires and if it is same as follows, it is normal but if not, replace it.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	14.68	12.09	10	8.31	6.94	5.83	

6-3-8 (I) Check the heatsink temperature sensor of IPM

▶ This sensor is inside of the IPM module and PIN#24,25 of IPM module are the sensor terminal.
Usually PIN solder crack or short circuit with small metal object cause sensor error.
Check the object to make short circuit and solder condition of these pins.

Ambient temperature (°C)	15°C	20°C	25°C	30°C	35°C	40°C	
Resistance of thermistor [KΩ]	77.4	61.4	49.1	39.5	31.9	26	

6-3-9 (J) Check of operation current abnormal increase mode

▶ The operation abnormal current mode is the protection control for the safe operation by detecting the operation current of inverter aircon by the current sensor on the control board.

▶ If the operation current abnormal increase occurs,

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 °C)
  → Reinstall the outdoor unit so that the good ventilation can be made.
- If the Refrigerant is overcharged.
  → Check the amount of Refrigerant.
- If the comp is locked.
  → Replace the comp.
- If the comp is operating without the revolution of fan motor.
  → Check the fan motor connector, replace the fan motor.
- If the protection cover is operating with bending to the outdoor.
  → Take out the protection cover.
- If two outdoor units are operating face to face. (the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves
  → Take away the leaves for the good ventilation.

▶ Check and clean the dirt of current sensor block of outdoor control board.
especially • IC83 pin solder • C437 47uF • R459 47K • R461 4.7K

6-3-10 (K) Check of Current sensor, Voltage sensor on the board.

▶ These errors are from component trouble on the outdoor control board.
→ Replace the outdoor control board

6-3-11 (L) Check of instantaneous over-current protection of IPM circuit.

▶ Inverter instantaneous over-current protection mode is the mode to be actuated in order to prevent the damage of elements from the peak current of IPM circuit elements.

▶ In case that the inverter circuit instantaneous over-current protection mode actuates.

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
  → Reinstall the outdoor unit so that the good ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
  → Take out the cover.
- If two outdoor units are operating face to face, (the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves.
  → Take away the leaves for the good ventilation.
- If the Refrigerant is overcharged.
  → Check the amount of Refrigerant.

■ Unit defect

- If the comp is locked.
  → Replace the comp.
- If the comp is operating without the revolution of fan motor.
  → Check the fan motor connector and replace the fan motor.
- In case the parts of the control board is damaged.
  → Replace the outdoor control board.

6-3-12 (M) Check of the comp discharge gas temperature and OLP temperature abnormal rise.

▶ If the comp discharge gas temperature and OLP temperature rises higher than a certain level, it protects the circuit.

▶ If the comp discharge gas temperature and OLP temperature rises abnormally,

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50 (°C))
  → Reinstall the outdoor unit so that the good ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
  → Take out the cover.
- If two outdoor units are operating face to face, (the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves
  → Take away the leaves for the good ventilation.
- If the refrigerant is insufficient.
  → Fill up the amount of refrigerant.

■ Unit defect

- If the comp is locked.
  → Replace the comp.
- If the comp is operating without the revolution of fan motor
  → Take out the protection cover.
  → Check the fan motor connector and replace the fan motor.

6-3-13 (N) Check of the heatsink temperature abnormal rise

▶ If the air flow around the heatsink on the control box is not good, heatsink temperature will go up and the control box will have damage. So controller check the heatsink temperature and protect at the certain limit.
Possible troubles are fan motor trouble, fan motor drive circuit trouble and air flow blocking.

■ Condition of installation

- The ventilation is not good because the outdoor unit is installed wrong (the ambient temperature is higher than 50(°C)).
  → Reinstall the outdoor unit so that the ventilation can be made.
- In case that the operation is made with the cover bent of the outdoor unit.
  → Take out the cover.
- If two outdoor unit are operating face to face,(the bad ventilation is made)
  → Reinstall the outdoor unit for the good ventilation.
- The air circulation is bad due to the attachment of falling leaves.
  → Take away the leaves for the good ventilation.
- If the refrigerant is insufficient.
  → Fill up the amount of refrigerant.

■ Unit defect

- If the fan is locked with some object.
  → Remove the object.
- If the comp is operating without the revolution of fan motor.
  → Take out the protection cover
  → Check the fan motor connector(CN54), running capacitor, relay(RY503) and replace the fan motor.

6-3-14 (O) Check BLDC compressor starting error

▶ If the compressor have some trouble inside like locking or gas pressure of suction and discharge pipe is not balanced, Inverter system will give up compressor rotation control to protect itself from overcurrent.

▶ In case of compressor rotation starting trouble without overcurrent condition, controller detect the compressor rotation error and stop.

- Compressor wire connection is not good.
  → Check Compressor TAB terminal connection of the wire and connector to control box.
- Gas pressure balance is not good at stop condition.
  → Check service valve open.
  → Check EEV motor attachment and connector.
- Compressor is locked or have some mechanical damage.
  → Replace the compressor.

6-3-15 (P) Check no gas error

Charge standard amount of refrigerant.

6-3-16 (Q) Check of 4-Way valve

Check whether the wires of 4-Way valve and control board of outdoor units correct.
If it is normal, replace 4-Way valve.

6-3-17 (R) Check of outdoor unit fan motor (SH12BWHX only)

Check whether the wire of fan motor is connected to the control board (CN01) of outdoor unit.
Check the voltage on the control board of outdoor unit and if it is same as follows, replace fan motor.
Input power AC178V~AC264V.
→ CN01 1-3pin : DC250V±10% ~ DC370V±10%
→ CN01 4-3pin : DC15V

6-4 Fault Diagnosis of Major Parts

<table>
<tr><th>Part</th><th colspan="2">Diagnosis</th></tr>
<tr><td rowspan="3">• Indoor "Temp.Sensor"
• Indoor "Heat ex. Sensor"
• Outdoor "Temp.Sensor"
• Outdoor "Deice Temp. Sensor"</td><td colspan="2">Measure resistance with a tester.</td></tr>
<tr><td>Normal</td><td><table><tr><td>Ambient temperature</td><td>15°C</td><td>20°C</td><td>25°C</td><td>30°C</td><td>35°C</td><td>40°C</td></tr><tr><td>Resistance of thermistor[KΩ]</td><td>14.68</td><td>12.09</td><td>10</td><td>8.31</td><td>6.94</td><td>5.83</td></tr></table></td></tr>
<tr><td>Abnormal</td><td>∞, 0Ω ... open or short</td></tr>
<tr><td rowspan="2">• Outdoor "Discharge Temp.Sensor"
• Outdoor "OLP Temp.Sensor"</td><td>Normal</td><td><table><tr><td>Ambient temperature</td><td>0°C</td><td>10°C</td><td>20°C</td><td>30°C</td><td>40°C</td><td>50°C</td></tr><tr><td>Resistance of thermistor[KΩ]</td><td>553</td><td>362</td><td>242</td><td>166</td><td>165</td><td>82</td></tr></table></td></tr>
<tr><td>Abnormal</td><td>∞, 0Ω ... open or short</td></tr>
<tr><td rowspan="3">Indoor Fan Motor</td><td colspan="2">Measure the resistance between terminals of the connector(CN72) with a tester.</td></tr>
<tr><td>Normal</td><td>At the normal temperature (10°C ~ 30°C)<table><tr><th>Compare terminal</th><th>Resistance(Ω)</th><th>Remark</th></tr><tr><td>Yellow, Blue</td><td>460Ω±10</td><td>Main</td></tr><tr><td>Yellow, Red</td><td>314Ω±10%</td><td>Sub</td></tr></table></td></tr>
<tr><td>Abnormal</td><td>∞, ... open or short</td></tr>
<tr><td rowspan="3">Outdoor Fan Motor</td><td colspan="2">Measure the voltage between motor wires with a tester.</td></tr>
<tr><td>Normal</td><td>At the normal temperature (10°C ~ 30°C)
✳ SH09BWHX only (AC Motor)<table><tr><th>Compare terminal</th><th>Resistance(Ω)</th><th>Remark</th></tr><tr><td>Black, Red</td><td>255Ω±10%</td><td>Main</td></tr><tr><td>Black, Yellow</td><td>415Ω±10%</td><td>Sub</td></tr></table></td></tr>
<tr><td>Abnormal</td><td>∞, ... open or short</td></tr>
<tr><td rowspan="3">Stepping Motor</td><td colspan="2">Measure the resistance between the red wire and each terminal wire with a tester.</td></tr>
<tr><td>Normal</td><td>About 300Ω at the normal temperature (20°C ~ 30°C)</td></tr>
<tr><td>Abnormal</td><td>∞, ... open or short</td></tr>
</table>

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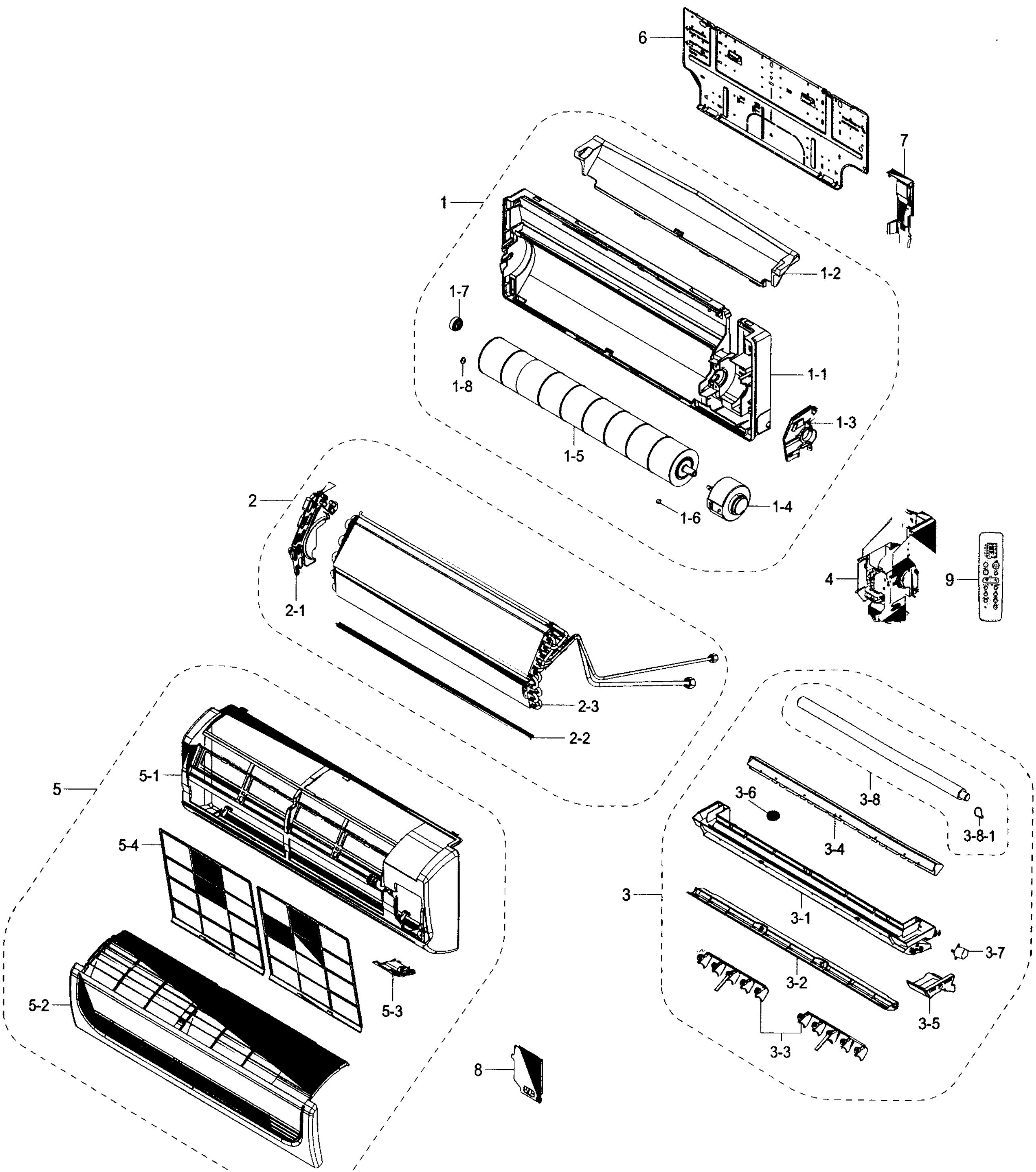
7. Exploded Views and Parts List

7-1 Indoor Unit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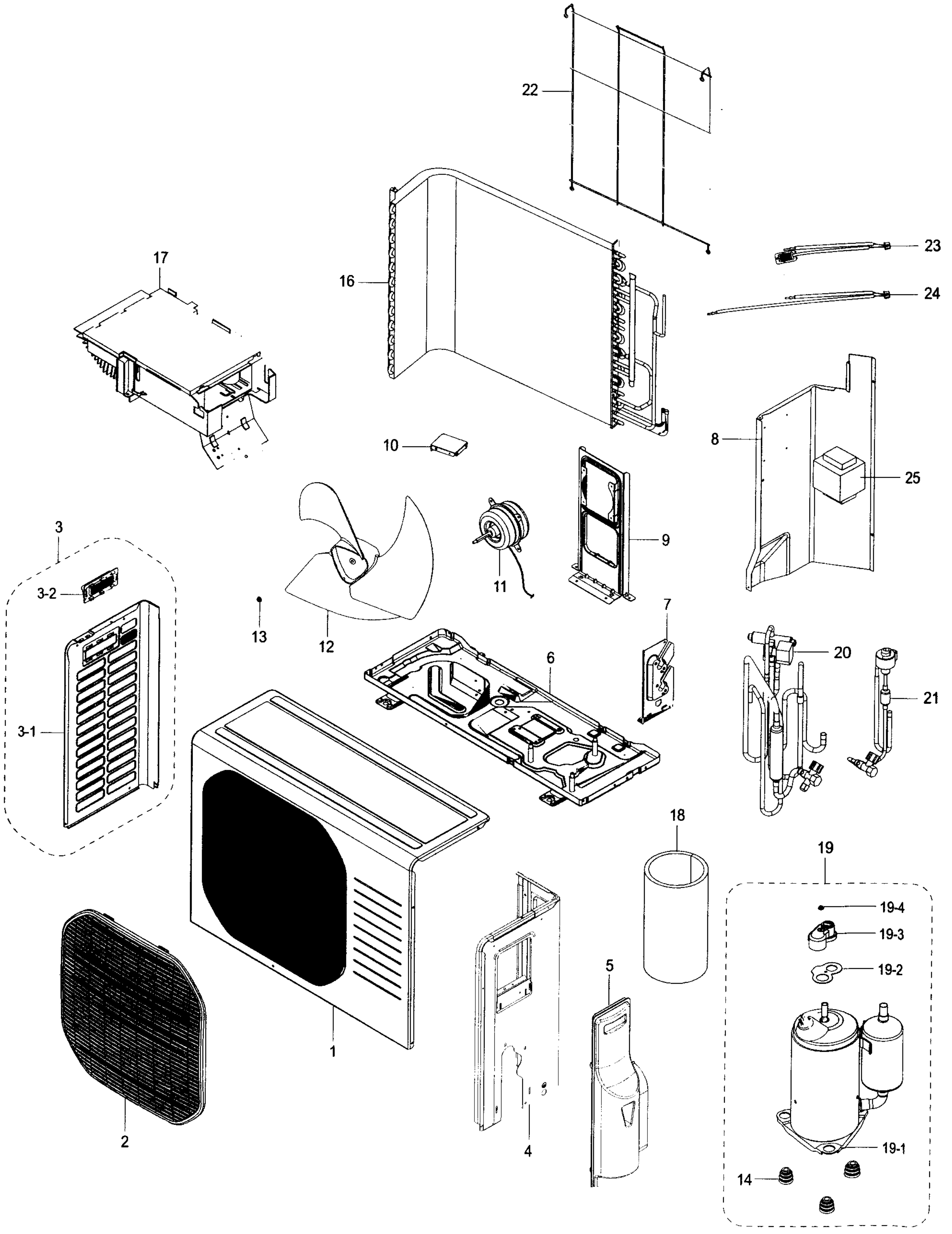
You can search for the updated part code number through the ITSELF.
URL : http://itself.sec.samsung.co.kr

■ Parts List

No.	Code No.	Description	Specification	Q'TY		Remark
				SH09BWH	SH12BWH	
1	DB94-00454B	ASS'Y-BACK BODY	ASS'Y	1	1	
1-1	DB61-01632A	BACK-BODY	HIPS	1	1	
1-2	DB69-00834A	CUSHION-BACK BODY	EPS	1	1	
1-3	DB61-01634A	SUPPORTER-EVAP RH	HIPS	1	1	
1-4	DB31-00219A	MOTOR-IN	YDK-016S1408-01	1	1	
1-5	DB94-00456A	ASS'Y-CROSS FAN	OD92x635	1	1	
1-6	DB97-02075A	ASS'Y-BOLT SPECIAL	ASS'Y	1	1	
1-7	DB73-00181A	RUBBER-BEARING	RUBBER	1	1	
1-8	DB94-40007A	MOLD-BEARING	BEARING	1	1	
2	DB96-03112A	ASS'Y CYCLE IN	ASS'Y	1	1	
2-1	DB63-00850A	COVER-BEARING	ABS	1	1	
2-2	DB60-00118A	SPACE-EVAP LOW	PVC	1	1	
2-3	DB96-03060A	ASS'Y-EVAP	1.3S, 2x14	1	1	
3	DB94-00457D	ASS'Y-TRAY DRAIN	ASS'Y	1	1	
3-1	DB63-00848A	TRAY-DRAIN	ABS	1	1	
3-2	DB61-01635A	BLADE-H	HIPS	1	1	
3-3	DB61-01636A	BLADE-V	PP	2	2	
3-4	DB63-00849A	TRAY-STABILIZER	ABS	1	1	
3-5	DB69-00839A	CUSHION EPS-TRAY-RH	EPS30	1	1	
3-6	DB73-00180A	RUBBER-CAP DRAIN	GUM-EPM	1	1	
3-7	DB95-20138A	ASS'Y-MOTOR STEPPING	PM24-600g, 24BYJ48	1	1	
3-8	DB94-00458B	ASS'Y DRAIN-HOSE	ASS'Y	1	1	
3-8-1	DB61-01715A	CLIP TERMINAL-HOSE	STS, PI1.0	1	1	
4	DB93-02755A	ASS'Y CONTROL-IN	ASS'Y	1	1	Refer to page 34
5	DB92-00536C	ASS'Y PANEL FRONT	ASS'Y	1	1	
5-1	DB64-00989B	PANEL FRONT	PS	1	1	
5-2	DB64-00990B	GRILLE AIR INLET	HIPS	1	1	
5-3	DB64-00991A	ASS'Y COVER-DISPLAY	ASS'Y	1	1	
5-4	DB63-00846A	GUARD-AIR FILTER	PP	2	2	
6	DB70-00406A	PLATE-HANGER	SGCC-M	1	1	
7	DB61-01638A	HOLDER-PIPE	PS	1	1	
8	DB63-00844A	COVER TERMINAL	ABS-V0	1	1	
9	DB93-02532F	ASS'Y REMOCON	ARH-1402	1	1	

7-2 Outdoor Unit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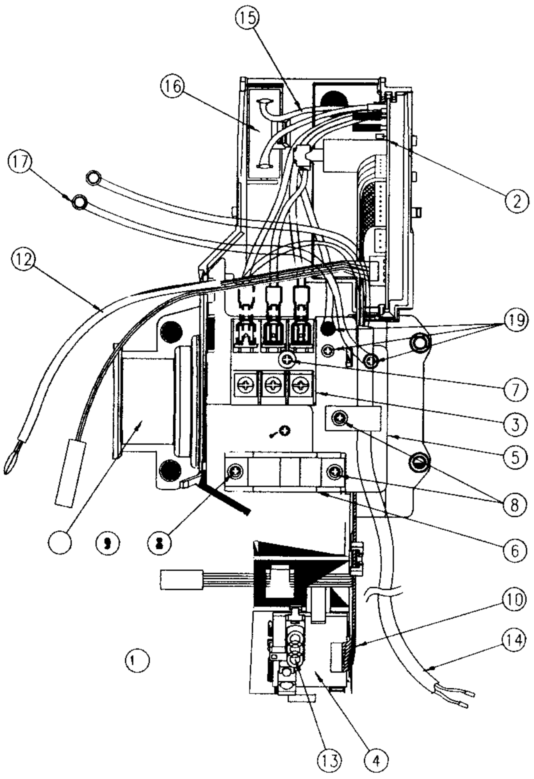
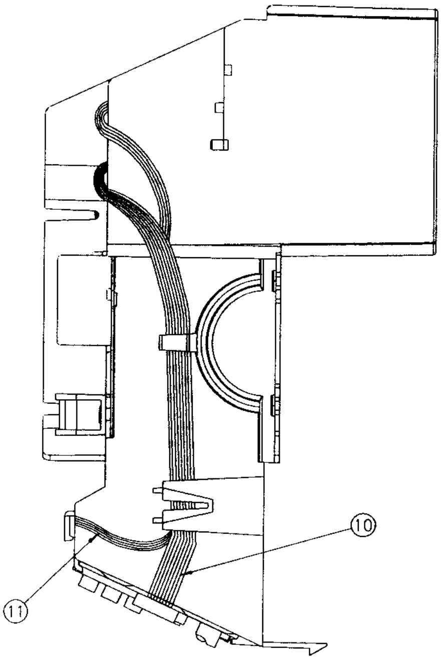
■ Parts List

No.	Code No.	Description	Specification	Q'TY	
				SH09BWHX	SH12BWHX
1	DB90-01581A	ASS'Y-CABI FRONT	ASS'Y	1	1
2	DB63-00847A	GUARD FAN	PP	1	1
3	DB90-01332A	ASS'Y-CABI SIDE LF	ASS'Y	1	1
3-1	DB64-01094A	CABINET-SIDE LF COATING	SC-90073T	1	1
3-2	DB64-00992A	HANDLE-LF	PP	1	1
4	DB90-01546A	ASS'Y-CABI SIDE RH	ASS'Y	1	1
5	DB63-00843A	COVER-VALVE	PP	1	1
6	DB90-01330F	ASS'Y BASE-OUTDOOR	ASS'Y	1	1
7	DB99-00401B	ASS'Y VALVE-BRACKET	ASS'Y	1	1
8	DB94-00584A	ASS'Y PARTITION	ASS'Y	1	1
9	DB61-01644A	BRACKET MOTOR	SGCC-M	1	1
10	DB97-02225A	ASS'Y SUPPORT-PLATE B/M		1	1
11	DB31-00220A	MOTOR FAN	YDK-020S62213-03	1	-
	DB31-00238A	MOTOR FAN	SIC-52FV-D828-1	-	1
12	DB67-00397A	FAN-PROPELLER		1	1
13	DB60-30004A	NUT-FLANGE		1	1
14	DB63-00763A	GROMMET ISOLATOR	NR	3	3
15	DB60-30028A	NUT-WASHER		3	3
16	DB96-03602A	ASS'Y COND	ASS'Y	1	1
17	DB93-02740A	ASS'Y CONTROL OUT	SH12BWHX	-	1
	DB93-02740B	ASS'Y CONTROL OUT	SH09BWHX	1	-
18	DB63-01043A	FELT COMP SIDE	FELT	1	1
19	DB95-00556A	ASS'Y COMP		1	1
19-1	G4C090LU1ER	COMPRESSOR	G4C090LU1ER	1	1
19-2	DB63-00765A	GASKET-TERMINAL		1	1
19-3	DB63-10034A	COVER-TERMINAL		1	1
19-4	DB60-30018A	NUT-FLANGE		1	1
20	DB99-00481A	ASS'Y VALVE 4WAY	ASS'Y	1	1
21	DB99-00482A	ASS'Y VALVE EEV	ASS'Y	1	1
22	DB71-00090E	BAR-STEEL	ASS'Y	1	1
23	DB32-00083C	ASS'Y THERMISTOR OUT	ASS'Y	1	1
24	DB32-00121A	ASS'Y THERMISTOR OLP/SUC	ASS'Y	1	1
25	DB33-00021A	SOLENOID-REACTOR	12A, 21mH	1	1

7-3 Ass'y-Control In(Code No : DB93-02755A)





■ Parts List

No.	Code No.	Description	Specification	Q'TY	Remark
1	DB61-01637A	CASE-CONTROL	ABS	1	
2	DB93-02754A	ASS'Y-PCB IN	ASS'Y	1	
3	DB65-00149B	ASS'Y-TERMINAL BLOCK	ASS'Y	1	
4	DB93-02483A	ASS'Y-PCB SUB	ASS'Y	1	
5	DB61-01639A	PLATE-CONTROL	SGCC-M, T1.2	1	
6	DB61-00171A	HOLDER-WIRE CLAMP	ABS	1	
7	6001-000929	SCREW-MACHINE	PH M3xL22	1	SNA
8	6001-000725	SCREW-MACHINE	TH M4xL16	3	SNA
9	6001-001054	SCREW-MACHINE	TH M4xL10	1	SNA
10	DB39-00949A	CONNECT WIRE-SUB	ASS'Y	1	
11	DB39-00147A	C/W STEP MOTOR UP/DOWN	ASS'Y	1	
12	DB32-00020D	ASS'Y-THERMISTOR	4P(103AT)	1	
13	DB63-00851A	COVER CLAMP	HIPS	1	
14	DB93-01549C	POWER CORD	250V 15A	1	
15	DB39-00183A	C/W MF CAPACITOR	22AWG	1	
16	2301-001339	RUN CAPACITOR	1.2µF/450V	1	
17	DB39-00148A	PLATE-EARTH WIRE	UL 1015 AWG #16 YEL/GRN 200mm	1	
19	6009-001001	SCREW-SPECIAL	TH M4XL8	3	SNA

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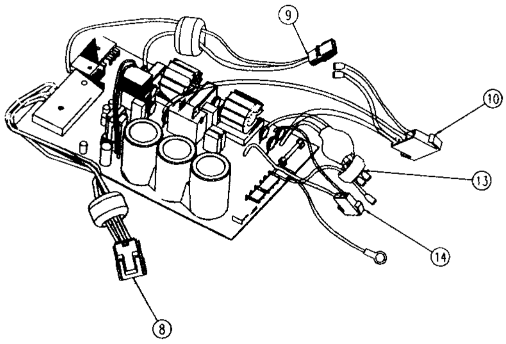
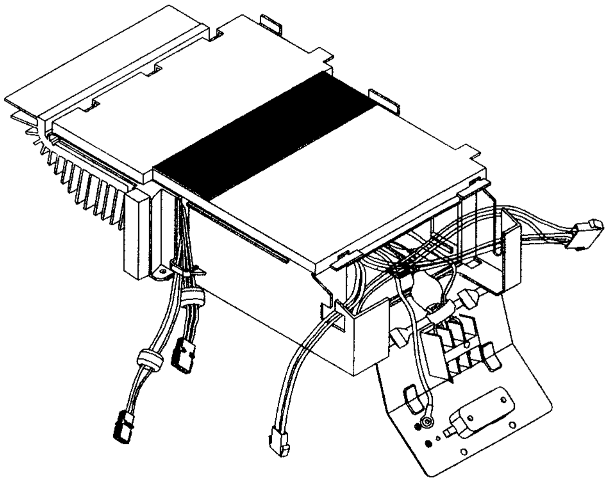
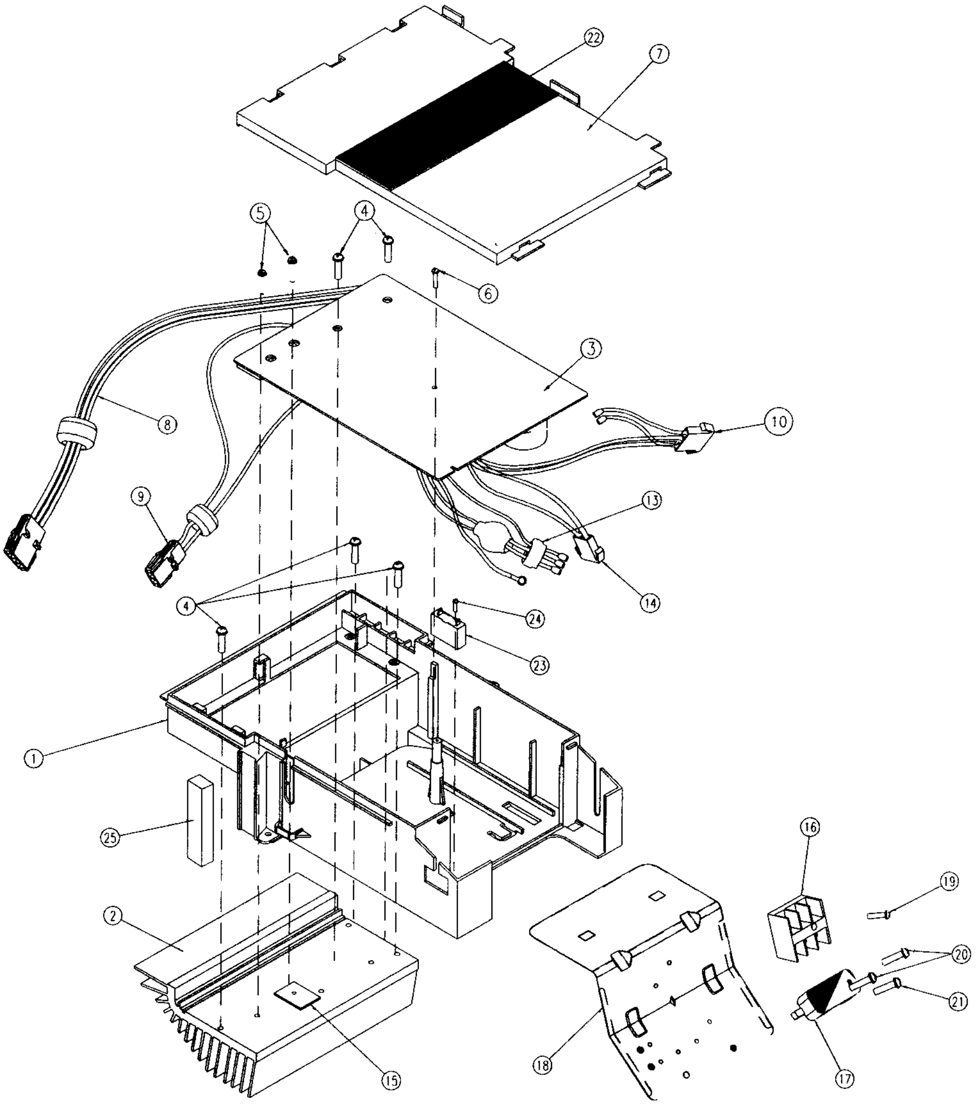
7-4 Ass'y Control Out

■ SH09BWHX : DB93-02740B
SH12BWHX : DB93-02740A



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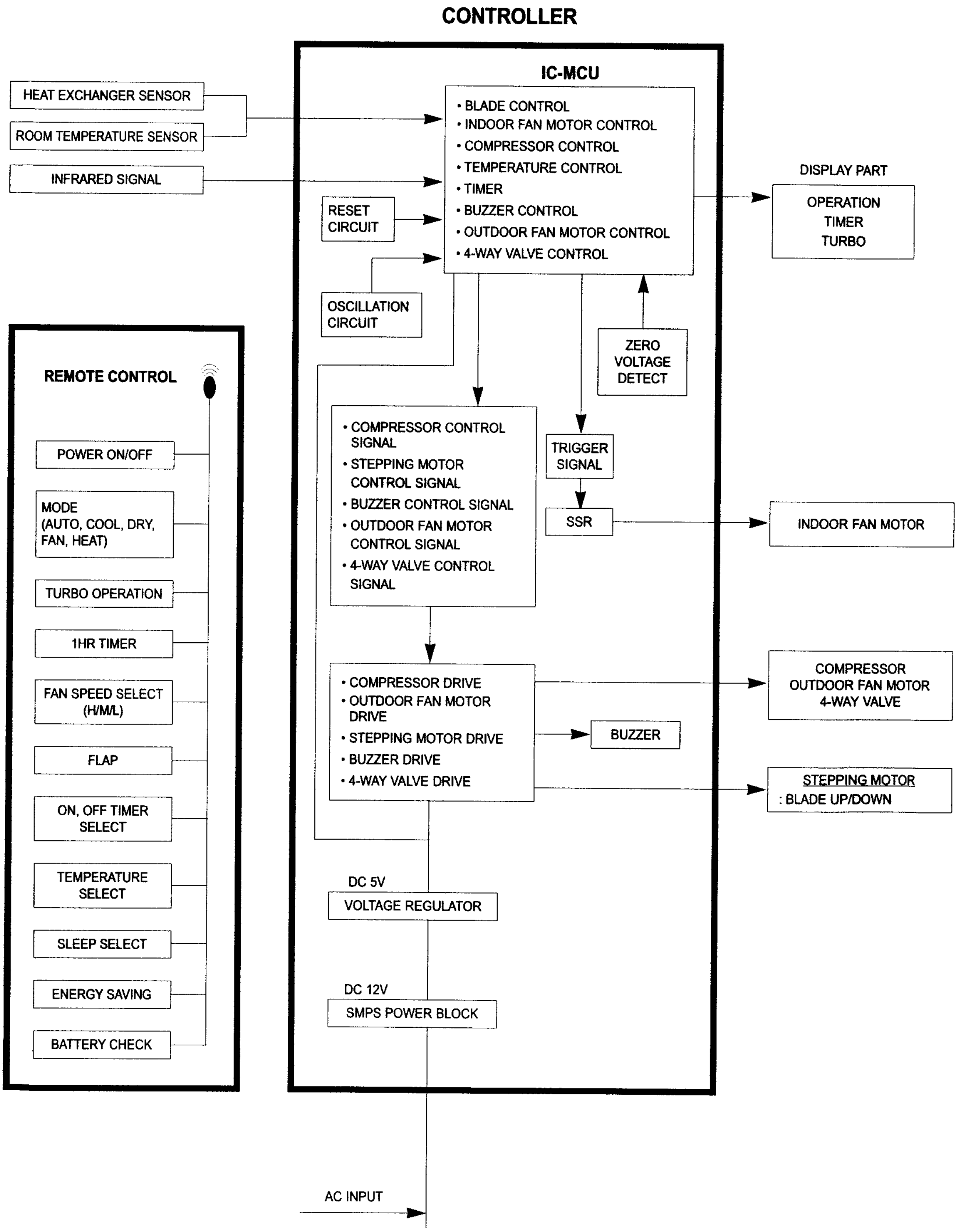
■ Parts List

No.	Code No.	Description	Specification	Q'TY	
				SH09BWHX	SH12BWHX
1	DB93-01627A	CASE CONTROL BASE	ABS 5V	1	1
2	DB62-02749A	HEAT SINK MAIN	-	1	1
3	DB93-02741A	ASS'Y PCB OUT	ASS'Y	-	1
	DB93-02741B	ASS'Y PCB OUT	ASS'Y	1	-
4	6006-001051	SCREW-MACHINE	M4xL16 WSP PH+	5	5
5	6006-000160	SCREW-MACHINE	M3xL16 WSP PH+	2	2
6	6002-000630	SCREW-TAPPING	PH,+,2S,M3,L8	1	1
7	DB61-01628A	CASE CONTROL COVER	RESIN-ABS	1	1
8	DB39-00608E	CONNECTOR WIRE COMP	UL1015 AWG#16	1	1
9	DB39-00607B	CONNECTOR WIRE REACTOR	UL1015 AWG#16	1	1
10	DB39-01003A	CONNECTOR WIRE FAN	UL1007 AWG#20	1	-
11	-	-	-	-	-
12	-	-	-	-	-
13	DB93-02775A	ASS'Y L/W POWER	UL1015 AWG#16	1	1
14	DB39-00649C	CONNECTOR WIRE 4 WAY V/V	UL1015 AWG#18	1	1
15	-	INSULATOR-MICA	-	1	1
16	DB65-00086A	ASS'Y TERMINAL BLOCK 3P	3P	1	1
17	DB61-00250A	HOLDER WIRE	PP	1	1
18	DB70-00465A	PLATE-CASE CONTROL	SGCC-MTO.6	1	1
19	6003-000325	SCREW-TAPPING	PH,+,2,M3,L20	1	1
20	6005-000643	SCREW-TAPPING	TH,+,1,M4,L10	2	2
21	6002-000171	SCREW-TAPPING	PH,+,2S,M4,L10	1	1
22	-	FOAMLEX	60x180xT2.0	1	1
23	DB93-00936A	RUN CAPACITOR	1.7μF/450V	1	-
24	-	SCREW-TAPPING	M3x14 WSP PH+	1	-
25	DB62-02541L	SEAL CASE CONTROL BASE	70x15xT10	1	1

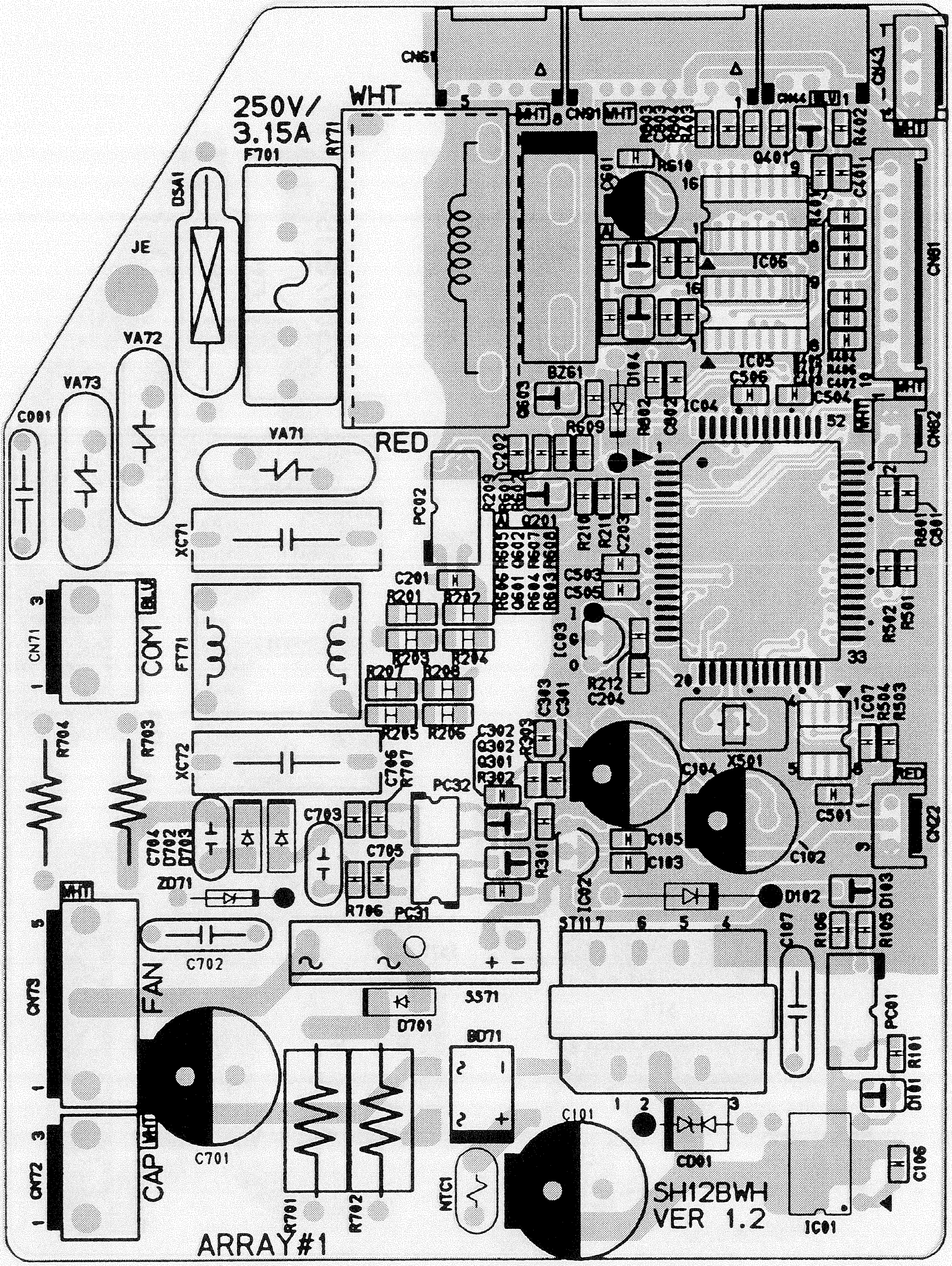
8. Block Diagram


CONTROLLER
IC-MCU
HEAT EXCHANGER SENSOR
ROOM TEMPERATURE SENSOR
INFRARED SIGNAL
• BLADE CONTROL
• INDOOR FAN MOTOR CONTROL
• COMPRESSOR CONTROL
• TEMPERATURE CONTROL
• TIMER
• BUZZER CONTROL
• OUTDOOR FAN MOTOR CONTROL
• 4-WAY VALVE CONTROL
RESET CIRCUIT
OSCILLATION CIRCUIT
DISPLAY PART
OPERATION
TIMER
TURBO
ZERO VOLTAGE DETECT
REMOTE CONTROL
POWER ON/OFF
MODE (AUTO, COOL, DRY, FAN, HEAT)
TURBO OPERATION
1HR TIMER
FAN SPEED SELECT (H/M/L)
FLAP
ON, OFF TIMER SELECT
TEMPERATURE SELECT
SLEEP SELECT
ENERGY SAVING
BATTERY CHECK
• COMPRESSOR CONTROL SIGNAL
• STEPPING MOTOR CONTROL SIGNAL
• BUZZER CONTROL SIGNAL
• OUTDOOR FAN MOTOR CONTROL SIGNAL
• 4-WAY VALVE CONTROL SIGNAL
TRIGGER SIGNAL
SSR
INDOOR FAN MOTOR
• COMPRESSOR DRIVE
• OUTDOOR FAN MOTOR DRIVE
• STEPPING MOTOR DRIVE
• BUZZER DRIVE
• 4-WAY VALVE DRIVE
BUZZER
COMPRESSOR
OUTDOOR FAN MOTOR
4-WAY VALVE
STEPPING MOTOR
: BLADE UP/DOWN
DC 5V
VOLTAGE REGULATOR
DC 12V
SMPS POWER BLOCK
AC INPUT

9. PCB Diagram

9-1 Ass'y PCB Indoor Unit : DB93-02754A

■ TOP



250V/
3.15A
F701
WHT
RY71
DSA1
JE
VA72
VA73
VA71
C001
RED
CN61
CN91
CN43
CN81
CN82
CN22
IC05
IC06
IC04
IC03
IC07
IC02
IC01
BZ61
PC02
PC32
PC31
PC01
XC71
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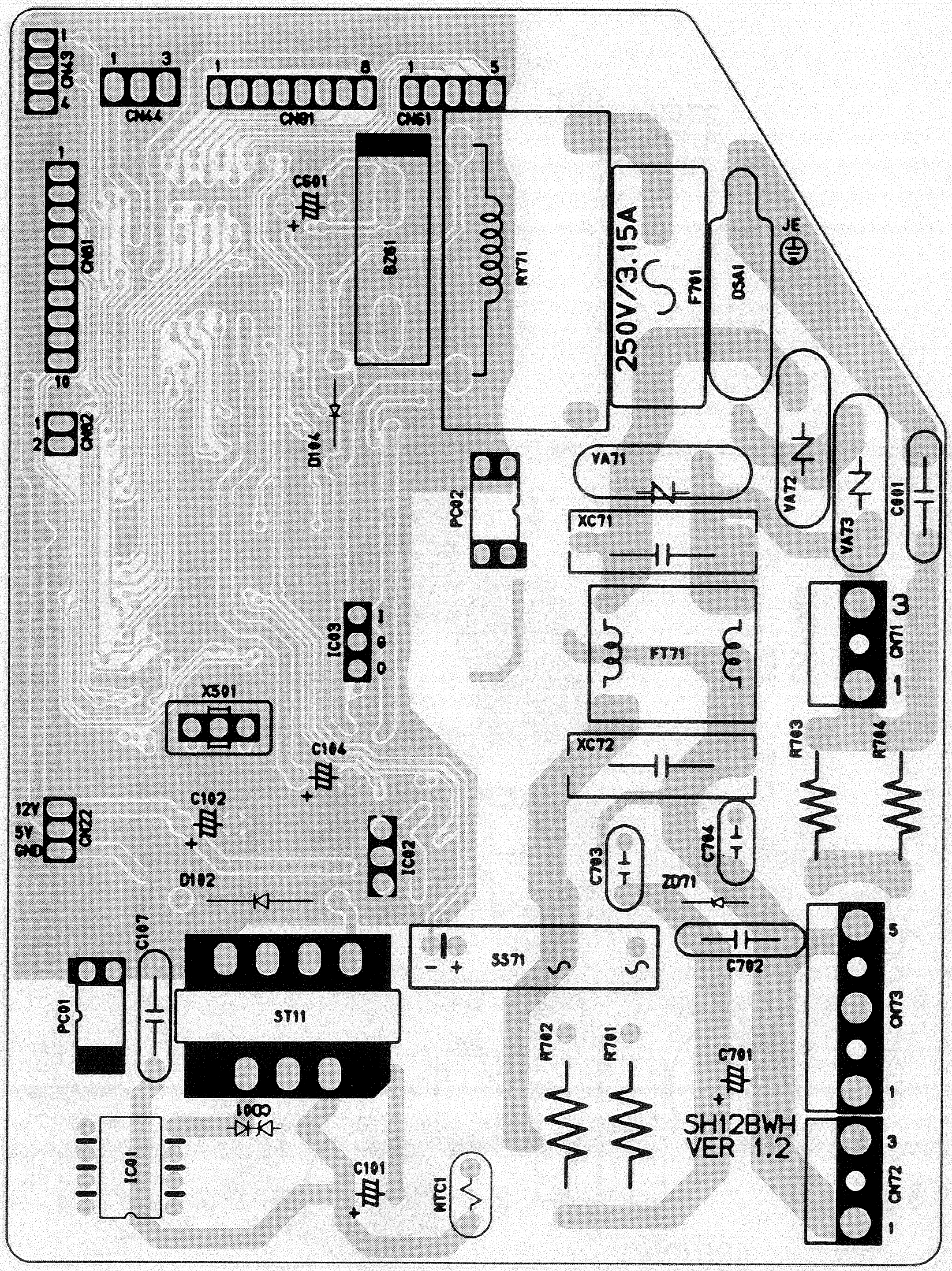
ARRAY#1
SH12BWH
VER 1.2

■ BOTTOM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BZ61
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F701
DSA1
JE
D104
CN62
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XC71
VA72
VA73
C001
IC03
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CN71
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■ Parts List

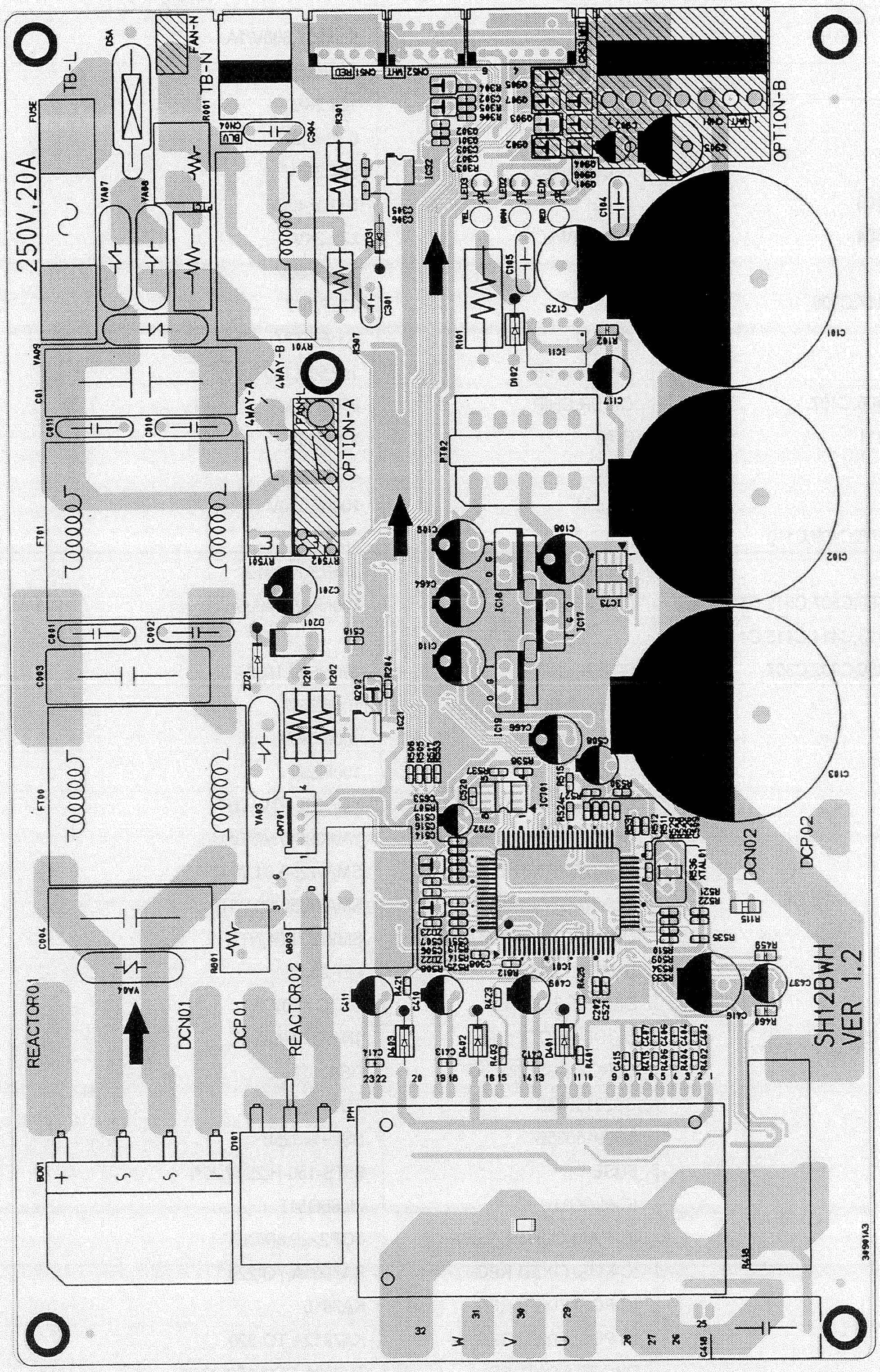
Location No.	Description	Specification	Q'TY
BD71	DIODE-BRIDGE	DF06S,600V/1A	1
BZ61	BUZZER-PIEZO	CBE2220BPC,85dB	1
C001	C-CERAMIC	102,2KV	1
C101	C-AL	10uF,450V	1
C102	C-AL	470uF,25V	1
C104	C-AL	470uF,16V	1
C107	C-AL	2.2nF,400V	1
C203,C202,C401,C801,C302,C705,C303	C-CER,CHIP	10nF,50V,2012	7
C204,C803,C402,C201,C403,C106,C105 C103,C503,C505,C506,C504,C501	C-CER,CHIP	100nF,50V,2012	13
C601	C-AL	47uF,50V	1
C701	C-AL	470uF,50V	1
C702	C-FILM	10nF,630V	1
C704,C703	C-AL	4.7nF,100V	2
C802,C301,C706	C-CER,CHIP	1nF,50V,2012	3
CD01	DIODE-TVS	ST02D-200,215V/200W	1
CN22	CONNECTOR-HEADER	SMW200-03,RED	1
CN43	CONNECTOR-HEADER	SMW200-04,NTR	1
CN44	CONNECTOR-HEADER	SMAW250-03,BLU	1
CN61	CONNECTOR-HEADER	SMAW200-05,NTR	1
CN71	CONNECTOR-HEADER	YW396-03AV,BLU	1
CN72	CONNECTOR-HEADER	YW396-03AV,WHT	1
CN73	CONNECTOR-HEADER	YW396-05AV,WHT	1
CN81	CONNECTOR-HEADER	SMW200-10,NTR	1
CN82	CONNECTOR-HEADER	SMW200-02,WHT	1
CN91	CONNECTOR-HEADER	SMAW200-08,NTR	1
D101	DIODE-ZENER	BZX84C3V6,3.6V/350mW	1
D102	DIODE-RECTIFIER	UG2D,200V/2A	1
D103	DIODE-ZENER	BZX84-C11,11V/350mW	1
D104	DIODE-RECTIFIER	UF4007,1KV/1A	1
D703,D702,D701	DIODE-RECTIFIER	MRA4005,600V/1A	3
DSA1	SURGE-ABSORBER	DSA-332mA	1
F701	FUSE-BLOCK	250V,3.15A,FAST-ACTING	1
FT71	LINE FILTER	USAV-07153,15.0mH	1
IC01	IC-POWER TRANSFORMER	TNY255P,8P/DIP	1
IC02	IC-POSI.FIXED REG	78L05A,TO-92	1
IC03	IC-VOLTAGE COMP.	KA7533,TO-92	1
IC04	IC-MICOM	MB90F462PF,STM-0266OC	1

■ Parts List (cont.)

Location No.	Description	Specification	QTY
IC06,IC05	TR-ARRAY	ULN2003D013TR,1W	2
IC07	IC-EEPROM	93LC56,128x16Bit	1
NTC1	THERMISTOR-NTC	NTC-22ohm,1.4A/3100K	1
PC01	PHOTO-COUPLER	PC817X2,130-260%	1
PC02	PHOTO-COUPLER	PC814X1,50-150%	1
PC31,PC32	PHOTO-COUPLER	TLP181-GRH,150-300%	2
Q201,Q603,Q601,Q401	TR-SMALL SIGNAL	2SC2412K,200mW	4
Q302,Q301	TR-DIGITAL	DTC114EKA,200mW	2
Q602	TR-DIGITAL	MMST2907A,200mW	1
R105	R-CHIP	100-J,1/10W,2012	1
R106	R-CHIP	220-J,1/8W,2012	1
R205,R206,R207,R208,R201 R202,R203,R204	R-CHIP	47K-J,1/4W,3216	8
R301	R-CHIP	1K-J,1/10W,1608	1
R302	R-CHIP	470-J,1/10W,1608	1
R303	R-CHIP	8.2K-F,1/10W,1608	1
R402	R-CHIP	6.8K-J,1/8W,2012	1
R403,R401,R607,R604,R602 R802,R210,R211,R212	R-CHIP	1K-J,1/8W,2012	9
R404,R405	R-CHIP	330-J,1/8W,2012	2
R407,R406	R-CHIP	6.8K-F,1/8W,2012	2
R501,R502	R-CHIP	120-J,1/8W,2012	2
R609,R608,R101	R-CHIP	470-J,1/8W,2012	3
R610	R-CHIP	560-J,1/8W,2012	1
R702,R701	R-METAL OXIDE	47K-J,3W	2
R704,R703	R-METAL OXIDE	4.7K-J,2W	2
R706	R-CHIP	100K-J,1/8W,2012	1
R707	R-CHIP	680-J,1/8W,2012	1
R803,R606	R-CHIP	4.7K-J,1/8W,2012	2
R804,R209,R603,R601,R605,R801	R-CHIP	10K-J,1/8W,2012	6
RY71	RELAY-POWER	UKH-12S,12Vdc/20A	1
SS71	SSR	AQG22212,12Vdc/2A	1
ST11	TRANS SWITCHING	EI1916-048	1
VA71,VA73,VA72	VARISTOR	INR14D561K-RS,560V,2500A	3
X501	RESONATOR-CERAMIC	4MHz	1
XC72,XC71	C-FILM,MPPF	100nF,275V	2
ZD71	DIODE-ZENER	1N4749A,24V/1W	1

9-2 Ass'y PCB Outdoor Unit : DB93-02741B(9K) / DB93-02741A(12K)

■ TOP

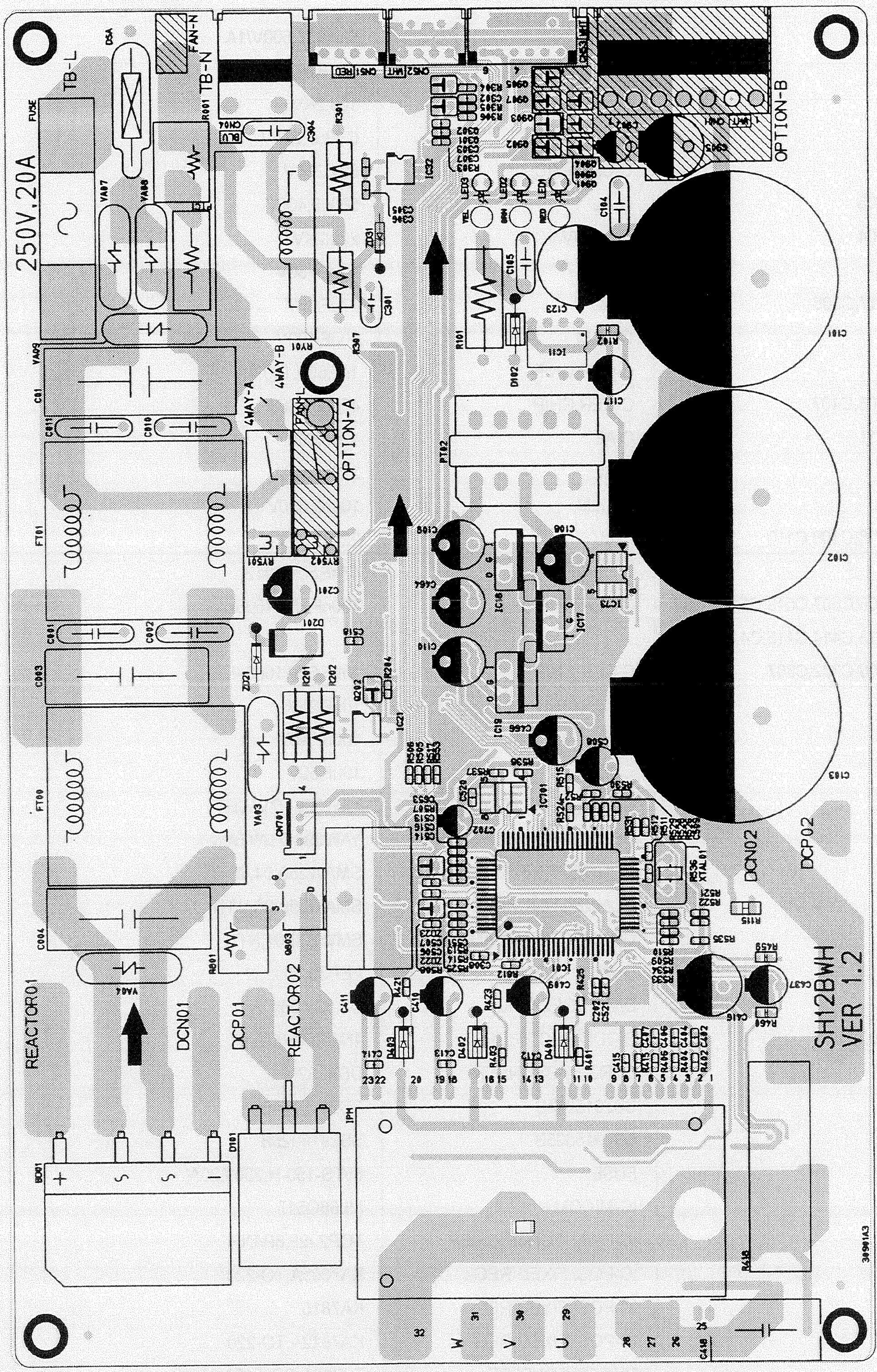

250V,20A
FUSE
TB-L
TB-N
FAN-N
OPTION-B
OPTION-A
4WAY-A
4WAY-B
FAN-L
REACTOR01
REACTOR02
DCN01
DCP01
DCN02
DCP02
SH12BWH
VER 1.2
FT01
FT00
PT02
C101
C102
C103
IC01
B001
D101
IPH
U
V
W

■ Parts List

Location No.	Description	Specification	Q'TY
D102	DIODE	1N4937,600V/1A	1
BD01	DIODE-BRIDGE	GSIB2560	1
C011,C010	C-CERAMIC	103,2KV	2
C003,C004	C-CERAMIC	0.33uF,275V	2
C01	C-CERAMIC	684,275V	1
C101,C102,C103	C-AL	560uF,400V	3
C104,C105,C304	C-CERAMIC	222,2KV	3
C123	C-AL	10uF,450V	1
C201,C437,C117,C508	C-AL	47uF,35V	4
C301	C-FILM	10nF,100V	1
C303,C308	C-CER,CHIP	1nF,50V,1608	2
C402,C404,C406,C407	C-CER,CHIP	470pF,1608	4
C409,C410,C411	C-AL	47uF,50V	3
C416,C905	C-AL	220uF,50V	2
C418	C-FILM	100nF,630V	1
C464,C466,C108,C109,C110	C-AL	220uF,25V	5
C509	C-CER,CHIP	47nF,50V,2012	1
C520,C516,C506,C507,C513,C514,C202 C518,C551,C413,C414,C415,C412	C-CER,CHIP	100nF,25V,1608	13
C521,C305,C306,C302,C307	C-CER,CHIP	10nF,50V,1608	5
C653	C-CERAMIC	10nF,25V	1
C702	C-AL	100uF,16V	1
C902	C-AL	10uF,50V	1
CN01	CONNECTOR-HEADER	YAW396-07V,WHT	1
CN04	CONNECTOR-HEADER	YAW396-03AV,BLU	1
CN52,CN51	CONNECTOR-HEADER	SMAW250-04,WHT	2
CN53	CONNECTOR-HEADER	SMAW250-06,WHT	1
CN701	CONNECTOR-HEADER	SMW200-04,NTR	1
D101	DUAL-DIODE	FEP30JP	1
D201	DIODE-RECTIFIER	US1G,400V	1
D401,D402,D403	DIODE-RECTIFIER	1N4937,600V,1A	3
DSA	SURGE-ABSORBER	DSA332M	1
FT01	SS2915044B	SS2915044B	1
FT00	SS2915025B	SS2915025B	1
FUSE	FUSE	65TS-150-H,250V,20A	1
IC01	IC-MICOM	ML66Q517	1
IC11	IC-PWM CONTROLLER	TOP222P,8P/DIP	1
IC17	IC-POSI.FIXED REG	KA7805A,TO-220	1
IC18	IC-POSI.FIXED REG	KA7815	1
IC19	IC-POSI.FIXED REG	KA7812A,TO-220	1
IC21,IC32	PHOTO-COUPLER	TLP181-GRH,150-300%	2
IC701	IC-EEPROM	93LC56,128x16Bit	1
IC73	IC-POSI.ADJUST REG	TL431,8P/SMD	1

9-2 Ass'y PCB Outdoor Unit : DB93-02741B(9K) / DB93-02741A(12K)

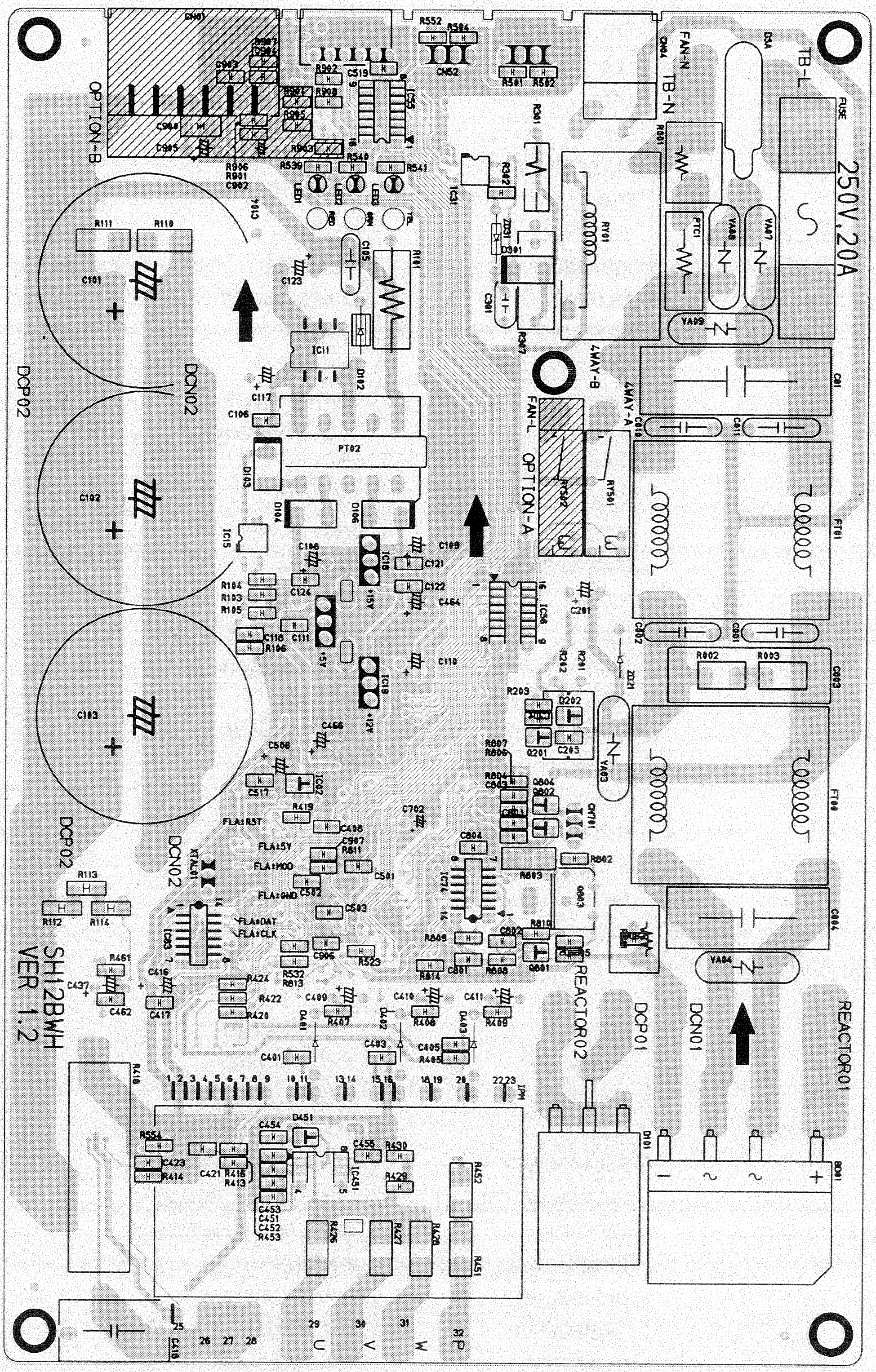
■ TOP


250V,20A
FUSE
TB-L
TB-N
FAN-N
OPTION-B
OPTION-A
4WAY-A
4WAY-B
FAN-L
PT02
FT01
FT00
C101
C102
C103
RY501
RY502
IC701
REACTOR01
REACTOR02
DCN01
DCP01
DCN02
DCP02
SH12BWH
VER 1.2
IPM
BD01
D101
W
V
U

■ Parts List (cont.)

Location No.	Description	Specification	Q'TY
IPM	IPM	FSAM15SM60A,*	1
LED1	LED	3mm/2.54,RED	1
LED2	LED	3mm/2.54,GRN	1
LED3	LED	3mm/2.54,YEL	1
PT02	PULSE TRANS	PT_30AM,*	1
PTC1	PTC	PTC,27R	1
Q202,Q302,Q301,Q905,Q907,Q902	TR-DIGITAL	KRC102S,*	6
Q803	IGBT-SGL	IRG4BC30F,*	1
Q901,Q903,Q904,Q906	TR-DIGITAL	KRA102S,SOT-23	4
R001	R-CEMENT	200-J,5W	1
R101	R-METAL OXIDE(S)	47K-J,3W	1
R102	R-CHIP	6.8-F,1/10W,2012	1
R115	R-CHIP	14.3K-F,1/4W,3216	1
R201	R-METAL OXIDE	47K-J,2W	1
R202	R-METAL OXIDE	100K-J,2W	1
R204,R515	R-CHIP	20K-J,1/8W,1608	2
R301,R307	R-METAL OXIDE(S)	4.7K-J,2W	2
R303,R304	R-CHIP	470-J,1/10W,1608	2
R305,R404,R403,R402,R401,R406,R415	R-CHIP	4.7K-J,1/12W,1608	7
R306	R-CHIP	560-J,1/12W,1608	1
R418	R-CHIP	0.02R-J,7W	1
R425,R423,R421	R-CHIP	100-J,1/8W,1608	3
R459	R-CHIP	47K-J,1/8W,2012	1
R460	R-CHIP	20K-J,1/8W,2012	1
R507,R508	R-CHIP	1K-F,1/12W,1608	2
R510,R511,R509	R-CHIP	100K-J,1/12W,1608	3
R512	R-CHIP	5.6K-J,1/12W,1608	1
R513,R514,R529,R528,R527,R526,R530 R531,R525,R524,R522,R521,R533,R534 R535	R-CHIP	10K-F,1/12W,1608	15
R536	R-CHIP	1M-J,1/10W,1608	1
R537,R538	R-CHIP	10K-J,1/10W,1608	2
R801	R-CEMENT	0.045-J,3W	1
R812,R506,R517,R505,R553	R-CHIP	330-J,1/12W,1608	5
RY01	RELAY-POWER	UKH-12S,12Vdc/20A	1
RY502,RY501	RELAY-MINIATURE	FTR-F3AA012E,12Vdc/5A	2
VA07,VA08,VA09,VA03,VA04	VARISTOR	INR14D561K-RS,560V,2500A	5
XTAL01	RESONATOR-CERAMIC	6.25MHz,*	1
ZD21	DIODE-ZENER	1N4749A,24V/1W	1
ZD23,ZD22	DIODE-ZENER	MMBZ5232B,*	2
ZD31	DIODE-ZENER	1N4751A,30V/1W	1

■ BOTTOM


OPTION-B
CN01
TB-L
TB-N
FAN-N
CN04
FUSE
250V,20A
DCP02
DCN02
4WAY-B
4WAY-A
FAN-L
OPTION-A
PT02
RY01
FT01
FT00
REACTOR02
DCP01
DCN01
REACTOR01
SH12BWH
VER 1.2
U
V
W
P

■ Parts List

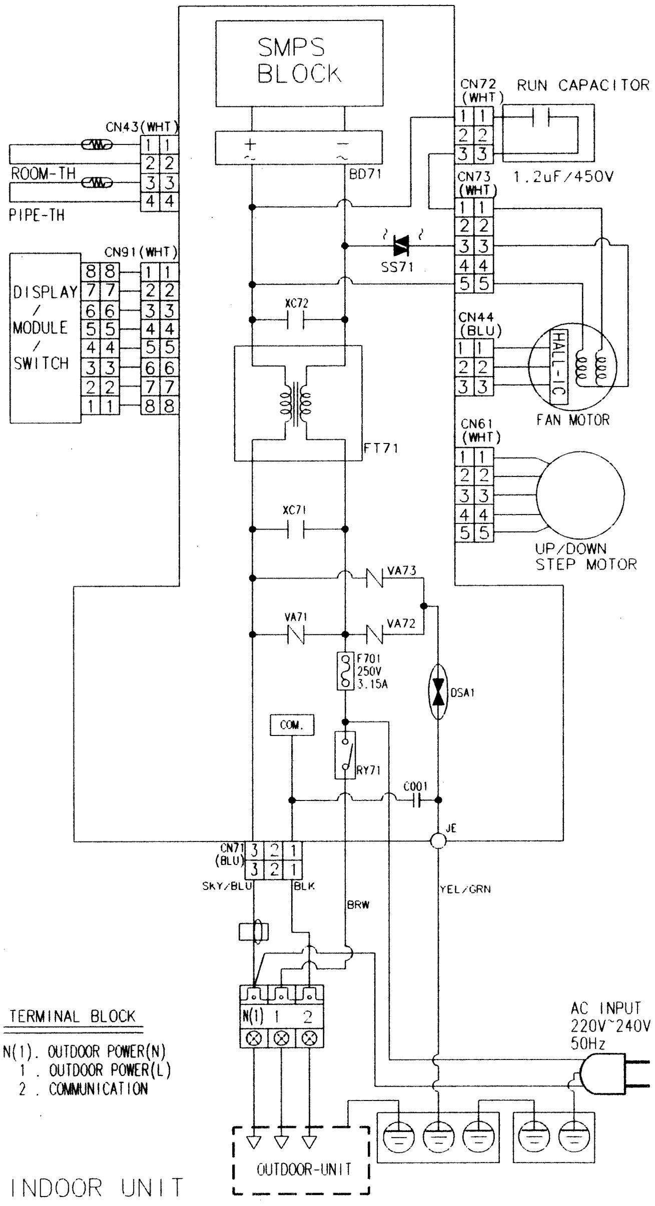
Location No.	Description	Specification	Q'TY
C111,C801	C-CER,CHIP	1uF,2012	2
C203,C421	C-CER,CHIP	1nF,50V,2012	2
C401,C403,C405,C517	C-CER,CHIP	1.2nF,2012	4
C106,C118,C121,C122,C124,C408 C417,C423,C519,C802,C803	C-CER,CHIP	100nF,50V,2012	11
C451	C-CERAMIC	33pF,25V	1
C452	C-CERAMIC	4.7nF,25V	1
C453,C454,C462	C-CER,CHIP	2.2nF,2012	3
C806	C-CER,CHIP	470pF,50V,2012	1
C900	C-CER,CHIP	1uF,3225	1
C204,C455,C501,C502,C503,C804 C805,C807,C903,C904,C906,C907	C-CER,CHIP	10nF,50V,2012	12
D103,D104,D106	DIODE-RECTIFIER	ES1D,200V/1A	3
D202,D451	DUAL-DIODE	DCB010,*	2
D301	DIODE	ES1D,200V	1
IC02	S80142	S80142ANMC-JC3T2,*	1
IC15	PHOTO-COUPLER	TLP181,*	1
IC31	PHOTO-COUPLER	TLP181-GRH,150-300%	1
IC451	IC-OP AMP	LA6393M,*	1
IC55,IC56	TR-ARRAY	ULN2003AFW,1W	2
IC74	IC-LOGIC	74HCT00D,SOP-14	1
IC83	LM324	LM324,*	1
Q201,Q802	TR-DIGITAL	KRC102S,*	2
Q801,Q804	TR-SMALL SIGNAL	BC847B,*	2
R002,R003	R-CHIP	470K-F,1/2W,5025	2
R105	R-CHIP	6.8K-F,1/8W,2012	1
R110,R111,R451	R-CHIP	180K-F,6432/1W	3
R112,R113,R114	R-CHIP	470K-F,1/4W	3
R203,R405,R461,R804	R-CHIP	4.7K-J,1/8W,2012	4
R407,R408,R409	R-CHIP	33-J,1/10W,2012	3
R104,R106,R413	R-CHIP	3.3K-J,1/8W,2012	3
R414,R523,R532,R808,R810	R-CHIP	10K-F,1/10W,2012	5
R416	R-CHIP	390-J,1/10W,2012	1
R419,R420,R422,R424	R-CHIP	100-J,1/8W,2012	4
R426,R427,R428	R-CHIP	300K-F,1W,6432	3
R429	R-CHIP	1.6K-F,1/8W,2012	1
R430	R-CHIP	51-F,1/8W,2012	1
R452	R-CHIP	150K-F,1W,6432	1

■ Parts List (cont.)

Location No.	Description	Specification	Q'TY
R453	R-CHIP	2.7K-F,1/8W,2012	1
R501,R504	R-CHIP	5.1K-F,1/8W,2012	2
R539,R540,R541	R-CHIP	2.2K-J,1/8W,2012	3
R502,R552	R-CHIP	24K-F,1/8W,2012	2
R554	R-CHIP	470-J,1/8W,2012	1
R802	R-CHIP	220-J,1/8W,2012	1
R803	R-CHIP	2.2K-F,6432/1W	1
R805	R-CHIP	3.3K-F,1/8W,2012	1
R302,R807	R-CHIP	1K-J,1/8W,2012	2
R103,R811,R813	R-CHIP	330-J,1/8W,2012	3
R814	R-CHIP	5.1K-J,1/8W,2012	1
R806,R809,R901,R902, R903,R904,R905,R908	R-CHIP	10K-J,1/8W,2012	8
R906	R-CHIP	6.8K-J,1/8W,2012	1
R907	R-CHIP	560-J,1/8W,2012	1

10. Wiring Diagram

10-1 Indoor Unit(9K / 12K)


SMPS BLOCK
+ −
BD71
CN72 (WHT)
RUN CAPACITOR
1.2uF/450V
CN73 (WHT)
CN43(WHT)
ROOM-TH
PIPE-TH
CN91(WHT)
DISPLAY / MODULE / SWITCH
SS71
XC72
CN44 (BLU)
HALL-IC
FAN MOTOR
FT71
CN61 (WHT)
XC71
UP/DOWN STEP MOTOR
VA73
VA71
VA72
F701 250V 3.15A
DSA1
COM.
RY71
C001
JE
CN71 (BLU)
SKY/BLU
BLK
BRW
YEL/GRN
TERMINAL BLOCK
N(1). OUTDOOR POWER(N)
1 . OUTDOOR POWER(L)
2 . COMMUNICATION
N(1) 1 2
AC INPUT 220V~240V 50Hz
OUTDOOR-UNIT
INDOOR UNIT

Code No : DB98-16585A

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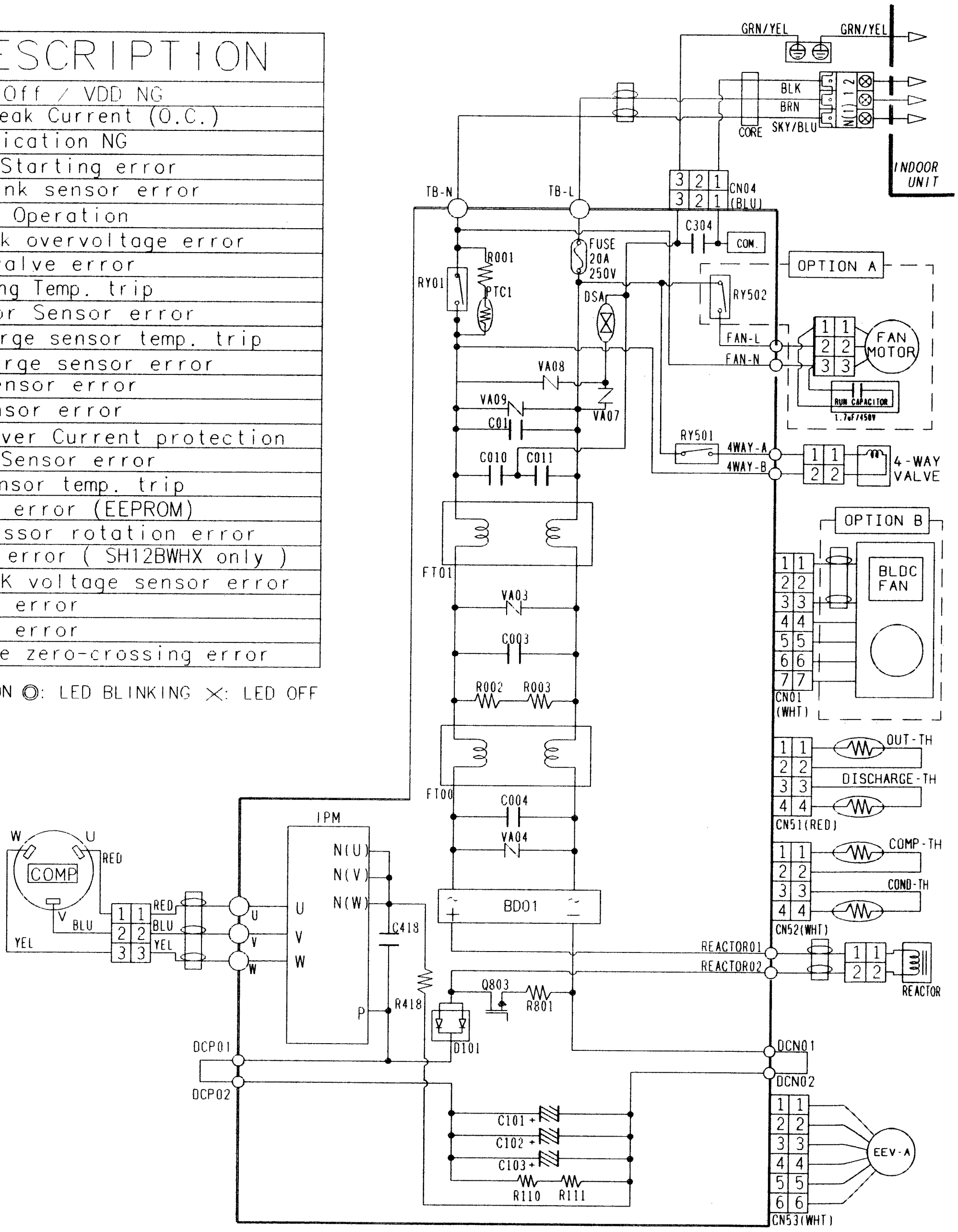
10-2 Outdoor Unit(9K/12K)

LED PATTERN			DESCRIPTION
YEL	GRN	RED	
×	×	×	Power Off / VDD NG
×	×	◎	Comp Peak Current (O.C.)
×	×	●	Communication NG
×	◎	×	Comp. Starting error
×	◎	◎	Heatsink sensor error
×	◎	●	Normal Operation
×	●	◎	DC-link overvoltage error
×	●	●	4Way valve error
◎	×	×	Heatsing Temp. trip
◎	×	◎	Outdoor Sensor error
◎	×	●	Discharge sensor temp. trip
◎	◎	×	Discharge sensor error
◎	◎	◎	OLP sensor error
◎	◎	●	CT sensor error
◎	●	×	Unit Over Current protection
◎	●	◎	Cond. Sensor error
◎	●	●	OLP sensor temp. trip
●	×	◎	OPTION error (EEPROM)
●	×	●	Compressor rotation error
●	◎	×	DC fan error (SH12BWHX only)
●	◎	◎	DC-LINK voltage sensor error
●	◎	●	PFC OC error
●	●	×	NO GAS error
●	●	◎	AC Line zero-crossing error

●: LED ON ◎: LED BLINKING ×: LED OFF


GRN/YEL
GRN/YEL
BLK
BRN
SKY/BLU
CORE
N(1) 1 2
INDOOR UNIT
TB-N
TB-L
CN04 (BLU)
3 2 1
C304
COM.
OPTION A
R001
RY01
PTC1
FUSE 20A 250V
DSA
RY502
FAN-L
FAN-N
FAN MOTOR
RUN CAPACITOR
VA08
VA09
VA07
C01
RY501
4WAY-A
4WAY-B
4-WAY VALVE
C010
C011
OPTION B
FT01
BLDC FAN
VA03
C003
CN01 (WHT)
R002
R003
OUT-TH
DISCHARGE-TH
CN51(RED)
FT00
C004
VA04
IPM
N(U)
N(V)
N(W)
COMP-TH
COND-TH
CN52(WHT)
W
U
V
COMP
RED
BLU
YEL
C418
BD01
R418
Q803
R801
D101
REACTOR01
REACTOR02
REACTOR
P
DCP01
DCP02
DCN01
DCN02
C101
C102
C103
R110
R111
EEV-A
CN53(WHT)

OPTION	MODEL
OPTION A	SH09BWHX
OPTION B	SH12BWHX

Code No : DB98-17635A

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